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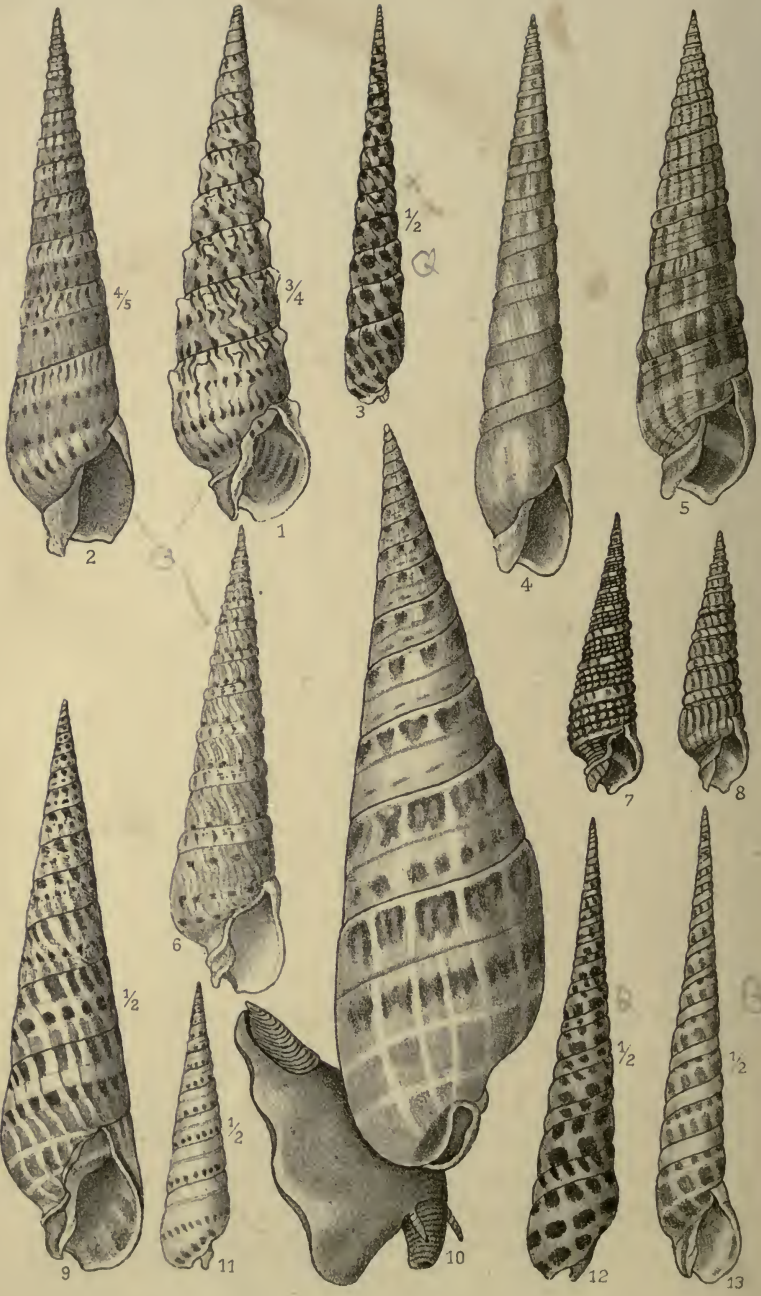
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MANUAL

OF

CONCHOLOGY;

STRUCTURAL AND SYSTEMATIC.

WITH ILLUSTRATIONS OF THE SPECIES.

BY GEORGE W. TRYON, JR.

CONSERVATOR OF THE CONCHOLOGICAL SECTION OF THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA.

VOL. VII.

TEREBRIDÆ, CANCELLARIIDÆ, STROMBIDÆ, CYPRÆIDÆ, OVULIDÆ, CASSIDIDÆ, DOLIIDÆ.

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MANUAL OF CONCHOLOGY.

Family *TEREBRIDÆ.*

Shell long, solid, narrow, many-whorled, whorls flattened, suture superficial; the aperture small, notched in front, columella without plaits. Operculum horny, annular, with apical nucleus.

Animal having the foot rounded in front, elongated behind; head rather large, with short, small tentacles furnished with eyes at their tips; between the tentacles extends anteriorly a rather long cylindrical trunk. Teeth subulate, arcuate, in two lateral rows (1·0·1); Pl. 12, fig. 40.

The family is now restricted to the single genus *Terebra* (auger-shells), including about 170 living species; the genus *Pusionella*, formerly referred to Terebridæ, being now included in the Pleurotomidæ. Troschel, however (Gebiss der Schnecken, ii, 28), found so much difference in the mouth-parts of the few species of Terebridæ examined by him, that he would have separated them into three families, notwithstanding the close relationship of their shells, had he not been deterred by the paucity of material for study. His three types are as follows :—

1. The mouth-mass at the end of the proboscis furnished with arrow-like teeth, as in Conus, and a poison-gland.

Hastula cærulescens.

2. No teeth, no venom-gland. *Acus muscaria.*

3. The mouth contains a true radula, supported by a lingual cartilage, with two rows of side-teeth; no venom-gland.

Myurella duplicata. Pl. 12, fig. 40.

Finally in examining a specimen of *T. subulata* (representative of the restricted group Terebra), Troschel only obtained negative results; seeing no teeth, although the poison-gland was present.

About 25 fossil species are known, commencing with the Eocene. Conrad's genera *Pyramitra*, *Cælatura* and *Terebrifusus*, referred by him to Terebridæ, are not members of the group.

The geographical distribution of Terebra is tropical and subtropical, and the species appear to be inhabitants of shallow water principally; indeed, none have occurred, so far, at great depths.

Gray, in 1834 (Zool. Proceedings, 59), enumerates 42 species, excluding those subsequently referred to Bullia; half of these were first described in his paper. He thus groups them:—

I. Whorls with a posterior spiral sulcus, inner lip thin, concave. 30 species.

II. Whorls with posterior spiral sulcus, inner lip thickened, subelevated. 7 species.

III. Whorls without posterior sulcus. 5 species.

Kiener's monograph in his "Coquilles vivantes," contains 35 species.

Hinds described many species in the Zoological Proceedings for 1843, and he monographed the genus in Sowerby's Thesaurus Conchyliorum (i, p. 147 *bis* to 190, Pl. 41 to 45); enumerating and figuring 109 species.

Hinds remarks that "The only sectional division of the genus that has been attempted, is that of Mr. Gray in the above Proceedings. This division is three-fold; the two first of these depend on the presence of the peculiar girdling or division of the whorls, and which is very conspicuous in many species, but practically I fail to carry it out in detail. Some species also are so excessively variable in this character, that M. Kiener has described *T. castanea* as having girdled whorls, but has figured it without them. The latter writer has not attempted any grouping of the species in his monograph, and as he has done so in most cases, we may venture to infer that he did not see room for it here.

"It cannot be denied that among the numerous species are several shells which, taken by themselves, would furnish good grounds for sectional or even subgeneric divisions. And if we take *T. maculata* as the proper generic type, then *T. lanceata*,

T. armillata and *T. commaculata*, seem to offer strong points of difference, and good grounds for sectional heads. But, with every wish to establish some such divisions, I have found it impracticable so to group the species that there shall be little or no doubt which section they belong to; and unless this object is attained, I do not see any use in a division; science would not be benefitted merely by selecting the salient points and strong grounds of the exceptions, and leaving the crowd to follow as they may."

H. and A. Adams, in their "Genera of Recent Mollusca," include in the family Terebridæ the two subfamilies Terebrinæ and Pusionellinæ (the shells composing the latter are now considered a group of the family Pleurotomidæ).

They divide the subfamily Terebrinæ into two genera:—

Acus, Humphrey. Animal with eyes on the tips of the tentacles. Whorls without posterior band; aperture emarginate anteriorly, not produced into a canal; columella simple, incurved, not tortuous; outer lip simple, acute, without anterior sinus.

A. maculata, Linn.

Terebra, Adanson. Eyes at the outer bases of the tentacles. Whorls with spiral groove forming a posterior band; aperture very small, canaliculated; columella tortuous; outer lip anteriorly sinuous. *T. babylonia*, Lam.

These characters of the shell shade off into each other by gradual transitions, so that they afford no good grounds of division, and the position of the eyes is at the tips of the tentacles in all the species that have been examined. The eyes were erroneously figured by Quoy and Gaimard, in *T. subulata*, at the base of the tentacles, and this supposed peculiarity Messrs. Adams have made one of the points of distinction between their two genera. In the figure of the animal of *T. subulata*, in Gould's Moll. U. S. Expl. Exped., the eyes are correctly placed.

In the genus Acus, Messrs. Adams' have the following subgenera:—

Abretia, H. and A. Adams. Whorls longitudinally ribbed; columella simple, straight, produced. *A. cerethina*, Lam.

Hastula, H. and A. Adams. Whorls smooth; columella simple, straight, produced anteriorly. *A. albula*, Menke.

Euryta, H. and A. Adams. Turreted, subfusiform, smooth; whorls nodosely plicate, the last rather ventricose; columella

spirally twisted, forming a false umbilicus, pervious to the apex of the spire, much produced anteriorly; aperture somewhat effuse. *A. aciculata*, Lam.

Under Terebra, they admit the subgenus :—

Myurella, Hinds. Whorls furnished posteriorly with a tuberculated zone, anteriorly transversely sculptured, or, very rarely, smooth; columella tortuous and produced anteriorly.

T. affinis, Gray.

To complete the group of subgenera proposed in Terebridæ, I here add :—

Impages, Smith. Shell subulate, whorls entire, more or less longitudinally striate or punctate, suture indistinctly separated, with a narrow callous band above it. This name is substituted for *Leiodomus*, Gray, not Swainson ; Swainson's group belonging to Bullia. The character usually (but not always) obtains in the typical *T. cærulescens*, but in the other species quoted by Mr. Smith as members of this group it is mostly absent.

M. Deshayes, in 1857, described a number of new species in the "Journal de Conchyliologie," and in 1859 he published, in Zool. Proc. London, "A General Review of the Genus Terebra, and a Description of New Species." Excluding doubtful and unidentified forms, 221 species are enumerated, of which 90 are described by this author.

In the systematic arrangement of the species Deshayes mainly follows H. and A. Adams, thus (I add characteristic examples) :

First Division. (Acus, Humphrey.)

A. Shell buccinoid. (S. G. Euryta, Ad.). *T. aciculata*, Lam.
B. Shell elongated, subulate. *T. Senegalensis*, Lam.
C. Shell subulate, whorls flattened, usually striate at the suture.
  a. Aperture narrow.
    1. Finely striate at the suture. *T. cuspidata*, Hinds.
    2. Plications continuous from whorl to whorl. *T. concinna*, Desh.
  b. Aperture dilated at the base.
    1. Whorls smooth or finely striate. *T. cærulescens*, Lam.
    2. Plications continuous from whorl to whorl. *T. strigilata*, Linn.

D. Shell having the aperture oblong, narrow, the whorls numerous, grooved, plicated or cancellated. (MYURELLA, Hinds.)

a. A spiral groove nearly equally dividing the whorls. *T. duplicata*, Lam.

b. Sutural portion (or band) narrow. *T. dislocata*, Say.

Second Division. (TEREBRA, Adams.)

(No subdivisions). *T. oculata*, Lam.

Reeve, who monographed Terebra in 1860, in his "Conchologia Iconica," admits 155 species; a considerable reduction on the number enumerated by Deshayes, nearly half of whose species are here made synonyms, after examining their types in the Cumingian Collection. Mr. Reeve says: "M. Deshayes was induced to undertake the investigation of the genus under circumstances hardly favorable to the proper discrimination of the species. Specimens were transmitted to him in Paris, from the Cumingian Collection, and his means of comparison with the types of Mr. Hinds' species being necessarily limited, many that were already named were described by him as new, and many were described by him as new that a more extended series of specimens would have shown to be merely varieties. Out of 221 species cited by Deshayes, in his recent memoir, I have before me the original types and series of types of 214. All the figures of this monograph are drawn from the types themselves, and no subsequently described species is quoted as a synonym, except as resulting from an actual comparison with the types." Mr. Reeve's monograph is certainly worked up with more than usual care and judgment; nevertheless, he has made some erroneous identifications, as will be apparent in the course of the following pages.

In the present monograph, notwithstanding the additional species described and figured since 1860, the synonymy is much enlarged, and the admitted species reduced to about 120; exclusive of about 50 species, described but not figured, and therefore not susceptible of identification.

Agreeing with Mr. Hinds that the species of Terebra cannot be advantageously divided into subgenera (with the exception of Euryta), I have essayed a classification by sections and sub-

sections which will perhaps assist in grouping the species, although the presence of transitional forms makes the boundaries rather vague.

Genus TEREBRA, Adanson.

A. Whorls smooth, with or without a smooth sutural band, defined by a sulcus.

B. Shell with plicate or tuberculate band below the sutures, defined by a sulcus.

* Whorls plicate.

** Whorls smooth.

*** Cylindrically many-whorled; whorls with revolving sculpture, with or without less prominent longitudinal striæ.

C. No sutural band; whorls closely plicate or striate next the suture, elsewhere plicate or smooth.

Subgenus EURYTA, Adams.

Genus TEREBRA, Adanson.

A. *Whorls smooth, with or without a smooth sutural band defined by a sulcus.*

T. CRENULATA, Linn. Pl. 1, figs. 1, 2, 6.

Whorls obtusely noduled below the sutures; carneous cream-color, streaked with chestnut irregular lines between the nodules, and with three revolving rows of small chestnut spots below, two of which appear on the spire-whorls. Length, 3–5 inches.

Indian Ocean—Central Polynesia.

T. fimbriata, Deshayes (fig. 2) is a variety only, retaining the juvenile characters shown by the upper whorls of this and other smooth species of Terebra, namely, longitudinal plications and a strongly marked sutural band. *T. interlineata*, Desh. (fig. 6), is another example of the long persistence of juvenile characters, and may be equally referred here.

T. TIARELLA, Desh. Pl. 12, figs. 38, 39.

First few whorls plicate, the rest smooth, with spiral impressed striæ, sutural margin a little swollen and conspicuously nodulous; fulvous fawn or chocolate-colored. Length, 28–33 mill.

Cape of Good Hope.

T. DIMIDIATA, Linn. Pl. 1, figs. 13, 4.

Reddish orange, banded with oblong spots on a white ground, sutural band orange-red; upper whorls longitudinally plicate, lower ones smooth. Length, 3·5–5 inches.

Singapore, *Philippines*, *Central Polynesia.*

T. splendens, Desh. (fig. 4), from the China Sea, appears to be a small variety, the figure being natural size.

T. MACULATA, Linn. Pl. 1, figs. 9, 10.

Flesh-white, broadly banded with fawn-color, the bands often broken up into oblong, close markings, with a band of longitudinal black-purple strigations next the sutures, and below it a second much smaller band of spots or hieroglyphic markings; early whorls often longitudinally plicate; balance smooth.

Length, 4·5–6·5 inches.

Moluccas, *Australia*, *Philippines*—*Central Polynesia.*

Sometimes a spiral impressed line divides off as a sutural band, the upper row of strigations.

The Polynesians eat the animal, and use the shell shaped to a chisel in making canoes.

T. MUSCARIA, Lam. Pl. 1, fig. 12.

Yellowish white, with a row of oblong bright chestnut spots on a sutural band, and two (on the body-whorl three) similar rows below it; the spots are smaller and more widely separated than in the preceding species, and the form of the shell is narrower. Length, 3–6 inches.

Japan, *Philippines*—*Central Polynesia.*

Mr. Tapparone-Canefri's variety *callichloros* is founded on a narrow, brightly colored specimen figured by Quoy in the Voy. Astrolabe; there is no good reason for giving it a name.

T. CONSORS, Hinds. Pl. 3, figs. 32–34.

Shell smooth, the sutural band distinct and obsoletely plicate; whitish, with light chestnut obliquely longitudinal flames, interrupted on the periphery of the last whorl, below which they sometimes coalesce into a broad revolving band.

Length, 2·75 inches. *Society Islands.*

T. virginea, Desh. (fig. 33), and *T. glabra*, Desh. (fig. 34), are both described from worn specimens in which the coloring is no

longer very apparent, although Reeve has discovered traces of it upon the types.

T. SUBULATA, Linn. Pl. 1, fig. 3; Pl. 3, fig. 35.

Light flesh-color or yellowish, with two spiral series (on the last whorl three), of quadrangular distant chestnut or chocolate spots; upper whorls longitudinally plicate, and with a sutural band; in the later whorls this band is lost, but sometimes the whorls are somewhat swollen just beneath the sutures, although the impressed line defining the band is obsolete; surface smooth, or with impressed (sometimes minutely punctate) revolving lines. Length, 4–6 inches.

Japan, *Moluccas*, *Philippines*, *Society Islands*, etc.

Var. CONSOBRINA, Desh. Pl. 3, fig. 35.

More conically subulate than the type, with the spots smaller, the surface distantly encircled by punctate grooves, a sutural band slightly indicated.

Red Sea.

Barely distinguishable as a variety.

T. TIGRINA, Gmelin. Pl. 1, fig. 11.

Shell white, with a single row of chestnut spots just above the sutures, two rows on the last whorl, of which the lower one, near the base, is smaller; surface smooth, an unornamented band below the sutures is defined by an impressed line.

Length, 2–3 inches.

Sandwich Islands, *Central Polynesia.*

Reeve's locality, West Indies, is erroneous.

T. OCULATA, Lam. Pl. 2, fig. 20; Pl. 3, fig. 36.

Orange-brown, with a row of large white spots just below the sutures, and a second row below the middle of the body-whorl; whorls somewhat constricted in the middle.

Length, 3·5–5 inches.

Moluccas—Viti Islands.

According to Reeve, who has seen the type, *T. nebulosa*, Lorois (fig. 36), is the young of the species; the name being preoccupied, Deshayes changed it to *T. Loroisii.*

T. ARGUS, Hinds. Pl. 2, fig. 24.

Earlier whorls with a sutural band; whitish, with three rows of regularly disposed oval light fawn-colored spots, four rows on the body-whorl. Length, 3–4·5 inches. *Marquesas, Tahiti.*

This is *T. nebulosa*, Kiener, not Sowerby.

T. ROBUSTA, Hinds. Pl. 2, figs. 16, 17, 25.

Shell stout, with rugose growth-lines, earlier whorls plicate and with a sutural band; whitish, with longitudinal chestnut flammules, interrupted by a central white line so as to form two spiral series, with an additional basal series on the body-whorl. Length, 4–5·5 inches. *W. Coast of Central America.*

T. Loroisi, Guerin (not Desh.) = this species, and *T. incomparabilis*, Desh., is probably a young individual. *T. lingualis*, Hinds (fig. 17), is also not fully grown, and is a narrow variety in which the juvenile characters persist longer than usual. *T. insignis*, Desh. (fig. 25) = it.

T. CHLORATA, Lam. Pl. 11, fig. 21.

Shell smooth, whorls somewhat flattened, finely crenate towards the apex, sutural band defined by a superficial groove; yellowish white, with longitudinal splashes of milky chocolate on and below the band, and two interrupted bands of spots of the same color upon the body-whorl. Length, 3–4 inches.

Malacca, Seychelles, Mauritius, Sandwich Is.

T. Knorri, Gray, is a synonym.

T. ALBIDA, Gray. Pl. 12, fig. 29.

Whorls smooth, with a sutural band separated by a narrow depression; ivory-white, sometimes faintly stained with rust-color. Length, 2 inches. *Australia.*

T. FLAMMEA, Lamarck. Pl. 2, fig. 26.

Shell somewhat more slender than the preceding species, the oblique growth-lines ridge-like; usually a shallow broad groove in the middle of the whorls; with occasional impressed spiral lines, of which one which divides the space above the central groove is more prominent; yellowish white, interruptedly strigate with chestnut, often forming two interrupted bands on the spire whorls and three on the body-whorl.

Length, 3·5–5 inches. *Indian Ocean, China Sea, Madagascar.*

T. ORNATA, Gray. Pl. 2, fig. 28.

Shell stout, sutures crenulated towards the apex, with a well-defined sutural band; yellowish white, with three spiral series of regular chestnut spots, four on the body-whorl.

Length, 4·5 inches.

Galapagos Is.

T. FORMOSA, Desh. Pl. 2, fig. 27.

Shell rather slender, with a somewhat swollen sutural band not clearly separated from the whorls by an impressed line; upper whorls longitudinally plicate; yellowish white, with small chestnut spots on the band, and larger longitudinal markings below it, a third inferior series on the body-whorl.

Length, 2·75 inches.

Panama.

Described from a single specimen, and is possibly a young variety of *T. robusta.*

T. STRIGATA, Sowb. Pl. 2, fig. 29.

Whorls divided by a median groove, the upper ones plicate; yellowish white, longitudinally striped with chestnut.

Length, 3·5–5·5 inches.

Panama, Realejo.

Reeve gives Philippines (Cuming) and Moluccas as additional localities—which need confirmation. It is *T. elongata*, Wood, *T. zebra*, Kiener, and *T. flammea*, Lesson.

T. CERETHINA, Lam. Pl. 2, fig. 30, 14.

Upper whorls densely plicate, lower ones becoming smooth, with a sutural band bounded by an indistinct impressed line; flesh-white, rather closely longitudinally strigate with flesh-color or orange, crossed by several distant narrow revolving lines of the same color. Length, 2–3 inches.

Philippines to *Society Is.*

T. pulchra, Hinds (fig. 14), is a synonym.

T. LANCEATA, Linn. Pl. 11, fig. 10.

Whorls smooth, flattened, a little swollen below the sutures, earlier whorls plicated; white, crossed by narrow chestnut longitudinal streaks, interrupted at the periphery of the body-whorl by a white band. Length, 2–2·5 mill.

Taheiti, Moluccas, Mauritius.

T. PENICILLATA, Hinds. Pl. 11, fig. 11.

Stouter with more convex whorls than the preceding species, the longitudinal chestnut lines crowded, much more numerous than in *T. lanceata*. Length, 2 inches.

Seychelles, *Mauritius*.

Kiener figured both this and the succeeding varieties as *T. lanceata*, and von Martens, in his "Conchology of Mauritius," has recently so considered them: my material does not support this view; yet their substantial identity is not improbable.

Var. VENOSA, Hinds. Pl. 11, figs. 12, 13.

White, banded with light chocolate, with chestnut longitudinal lines; first whorls plicate, the others smooth, divided at the upper part by a row of punctures; sometimes all the whorls are plicate. Length, 1–1·5 inches. *Indian Ocean*.

Reeve remarks that "when plicately ribbed throughout, the shell, like the granulated varieties of Cones, is smaller than when it is smooth." One of these small, plicated shells has been described by Deshayes as *T. Crossei* (fig. 13). When the shell is plicate upon the lower whorls it appears to be the result of the impression of the chestnut streaks, which form the interstices of the plicæ.

T. BRAZIERI, Angas. Pl. 11, fig. 14.

Narrow, smooth, first whorls plicate, the others somewhat tumid or very shortly obsoletely plicate below the sutures; whitish, promiscuously longitudinally veined with chestnut, the strigations more numerous on the upper part of the whorls; body-whorl with a white band on the periphery, and below it a row of chestnut spots, sometimes coalescing into a chestnut band. Length, 1–1·5 inches.

New South Wales, *Tasmania*.

This is, perhaps, a variety of *T. lanceata*.

T. CIRCUMCINCTA, Deshayes. Pl. 11, figs. 8, 9.

White, with a few irregular yellowish streaks; whorls flatly convex, with four to six equidistant, pricked, linear revolving grooves. Length, 40 mill.

Red Sea (Deshayes); *Port Curtis*, *Australia* (Stutchbury).

Reeve's figure (fig. 9) does not agree well with his description, nor with the figure given by Deshayes.

B. *Shell with plicate or tuberculate band below the sutures, defined by a sulcus.*

* *Whorls plicate.*

T. AFFINIS, Gray. Pl. 2, figs. 22, 18.

Whorls with distinct subsutural band, covered with flat longitudinal ribs, separated by narrow impressed, often punctate lines; flesh-color, sparingly mottled with light chocolate or chestnut oblong markings and with a few distant revolving lines of the same color. Length, 1·5–2·25 inches.

Philippines, Seychelles, Viti Isles.

It is *T. eburnea*, Hinds (fig. 18), *T. striata*, Quoy, *T. pertusa*, Kiener, var.

T. VARIEGATA, Gray. Pl. 2, figs. 15, 19, 21, 23; Pl. 1, figs. 5, 7, 8; Pl. 3, figs. 31, 37, 38.

Spirally grooved, more or less longitudinally plicate on the upper, sometimes on all the whorls, sometimes becoming granular at the intersections of the sculpture, a swollen callous band below the sutures; whitish, marked with chestnut between the plications of the band, strigated with chestnut below it, with a central white band on the body-whorl, beneath which is a second series of strigations. Length, 2·5–3·25 inches.

Mazatlan, Guaymas, Lower and Southern California, Panama, Galapagos Is., China Sea, W. Africa.

T. armillata, Hinds (figs. 21, 23), *T. Hupei*, Lorois (fig. 5), *T. aspera*, Hinds (fig. 7), *T. Petiveriana*, Desh. (fig. 31), and *T. glauca*, Hinds (fig. 19), are synonyms. The following unfigured species, described by P. P. Carpenter, and which are smaller than the type, being but little over an inch in length, may constitute a minor variety. They occur at Mazatlan and extend northwards to Southern California: *T. albocincta*, *T. Hindsi*, *T. subnodosa*, *T. rufocinerea*; *T. simplex*, from Sta. Barbara and S. Pedro, Cal. Very probably the more northern distribution of this form of an essentially tropical genus will account for the smaller size of the specimens occurring on the California Coast; they are precisely like *T. variegata* of the same size and number of whorls, but seem not to grow larger.

To the above numerous synonyms from the West Coast of America are to be added *T. albicostata*, Adams and Reeve (fig.

8), from China Sea, and *T. Africana*, Gray, *T. intertincta*, Hinds (fig. 37), and *T. marginata*, Desh. (fig. 38), from West Africa. There can be little doubt of the identity of these species with *T. variegata*, and of the extensive distribution thus indicated—it is paralleled in other species of the genus as will be seen hereafter.

T. GOULDI, Desh. Pl. 3, fig. 39.

Whorls with a subsutural, nodulous band, closely longitudinally plicate below it; yellowish white, two-banded with very pale chestnut, three bands on the body-whorl.

Length, 2·5 inches. *Sandwich Islands.*

T. aciculina, Kiener, var. (t. 7, f. 13 *a*), is probably a young shell of this species.

T. CONCINNA, Desh. Pl. 12, figs. 37, 32.

Longitudinally finely plicated throughout, with a sutural band defined by a groove; yellowish flesh-color, the ribs lighter, with a row of chestnut spots below the suture. Length, 40 mill.

Japan.

T. Dillwyni, Desh. (fig. 32), is a synonym. Reeve erroneously made *T. concinna* a synonym of *T. strigilata*, Linn., and Pease changed the name to *T. divisa* on account of *Buccinum concinnum*, Dillwyn.

T. MARMORATA, Desh. Pl. 12, fig. 34.

Longitudinally plicate, pricked in spiral series in the interstices, the upper and more profound row indicating a sutural band; whitish, somewhat tessellated with large chestnut blotches, darker-spotted on the sutural margin, with a white band on the periphery of the body-whorl. Length, 1·25–1·5 inches.

Port Curtis, Australia (Stutchbury).

T. BADIA, Desh. Pl. 3, fig. 40.

Chocolate-colored, including the interior; longitudinally plicated, including a subsutural band, body-whorl somewhat ventricose, with several spiral granular striæ on the lower part.

Length, 2·5 mill.

China.

It is *T. castanea*, Hinds, not Kiener; altered by Deshayes as above, and by Reeve to *T. ligneola*.

T. SENEGALENSIS, Lam. Pl. 3, figs. 41–45; Pl. 12, fig. 33.

Shell with a subsutural band, surface varying from nearly smooth, showing only longitudinal flexuous growth-striæ, to longitudinally plicate; yellowish white, more or less interruptedly three-banded with pale or dark chestnut or chocolate, four or five bands on the body-whorl; sometimes the darker coloring suffuses the entire surface. Length, 3–4 inches.

Senegal, etc., *West Africa*.

It is *T. striatula*, Lam., *T. fuscomaculata*, Sowb.; probably *T. pugio*, Gmel., *T. festiva*, Desh. (fig. 45), *T. speciosa*, Desh. *T. raphanula*, Lam. (Pl. 12, fig. 33), said to occur at Amboina, has the markings somewhat tessellately arranged; a good series of specimens easily connect it with the typical coloring.

T. CINGULA, Kiener. Pl. 12, figs. 27, 28.

First whorls plicately ridged, the rest smooth, with a more or less defined sutural band; light fawn-color, encircled by two or three rows of chestnut blotches, forming interrupted bands.

Length, 3 inches.

Senegal (Kiener); *St. Christopher*, *W. I.* (Miller).

Closely allied to, and perhaps only a variety of, the preceding species. It is *T. fatua*, Hinds (fig. 28), the latter being simply more faded in coloring.

T. PURA, Deshayes. Pl. 12, fig. 30.

Whitish, shining; obsoletely banded at the suture by an impressed groove, obliquely longitudinally plaited, plaits rather distant, thin, gradually fading towards the aperture.

Length, 2·5 inches.

Zanzibar.

T. TROCHLEA, Desh. Pl. 12, fig. 35.

Longitudinally plicate, a depressed sutural band separated by a broad, profound sulcus, from the rest of the whorl, which is convex, this band is nodulous, the nodules becoming evanescent on the last whorl; maculate and flammulate with chestnut and white. Length, 65 mill.

Zanzibar.

T. DUSSUMIERI, Kiener. Pl. 3, figs. 46–48.

Closely narrowly longitudinally plicate, the ridges becoming partially obsolete on a subsutural band; pale chestnut with a

white band below the middle of the whorls, and whitish on and just below the band. Length, 3–4 inches.

China, *Japan*.

Too closely allied to *T. duplicata*, Lam. The white band, however, is rather broader, the plications narrower, sharp-edged and partially obsolete on the band—which is somewhat concave. *T. evoluta*, Deshayes (fig. 47), described from a single specimen in the Cumingian Collection, appears to be only a slight variation of the typical form; another variety is *T. Bernardii*, Desh. (fig. 48).

T. DUPLICATA, Linn. Pl. 4, figs. 49–51.

Flatly longitudinally ribbed, divided by an impressed line below the sutures, forming a sutural band; grayish or blush-white to chestnut or chocolate, with a single narrow median white band. Length, 2·5–3·5 inches.

Moluccas, *Singapore*, *Zanzibar*, *Madagascar*, *China* to *Viti Islands*, etc.

T. Reevei, Deshayes (fig. 50), is a colorless example.

Var. LAMARCKII, Kiener. Fig. 51.

The white band filleted with chestnut or purplish spots in a single somewhat distant series.

T. ANOMALA, Gray. Pl. 12, fig. 36.

Smooth, polished, whorls plicate above, divided by an impressed, punctate line near the suture; cinereous or fawn-color, lighter on the sutural band, with a whitish band on the periphery. Length, 1·5 inches.

Singapore, 7 fms. (Cuming).

Reeve confounded this species with the shell which he erroneously refers to *aciculina*, Lam., and which must stand as *aciculina*, Reeve—Lamarck's shell being a synonym of *T. cinerea*, Born. The present species is readily distinguished by its sutural band.

T. SPECTABILIS, Hinds. Pl. 4, figs. 52–57.

Ribs distant, thin, subnodulous above and below a deep groove which divides off a sutural band; leaden or chestnut-

brown, usually nearly white on the sutural band, and with a central white band on the body-whorl. Length, 1·25–2 inches.

Guinea (Humphreys); *Sumatra* (Cuming); *Tasmania* (Woods).

T. Jukesii, Desh. (fig. 54), appears to me to be a synonym; as are also *T. addita*, Desh. (fig. 55), *T. geminata*, Desh. (unfigured), probably *T. Kieneri*, Desh. (fig. 56), and *T. gracilis*, Reeve, not Gray (fig. 57).

T. LONGISCATA, Desh. Pl. 4, fig. 58.

With a sutural band defined by a groove, strongly plicately ribbed, the ribs rather angular, the interstices with elevated revolving striæ; livid fuscous gray. Length, 27 mill.

Philippines (Cuming).

T. USTULATA, Desh. Pl. 4, fig. 59.

Sutural band depressed, longitudinally ribbed; pale chestnut or whitish, the depressed band and lower half of the body-whorl darker brown. Length, 32–38 mill. *Tasmania.*

In coloring and form somewhat like the next species.

T. GEMMULATA, Kiener. Pl. 4, figs. 61, 62.

Shell longitudinally, narrowly, distantly plicate, plicæ curved, terminating in nodules below the groove of the sutural band, the band also bearing a single row of nodules; yellowish white, the lower row of nodules white, with a rather broad white band on the middle of the body-whorl, below which the whorl is smooth and chestnut-colored. Length, 45 mill. *Chili.*

Reeve, who saw the original specimen of the unfigured *T. Chilensis*, Desh., adds it to the synonymy. Very probably *T. Patagonia*, d'Orb. (fig. 62), should be added as a colorless specimen.

T. DISLOCATA, Say. Pl. 4, figs. 63–67, 69; Pl. 12, fig. 31.

Longitudinally plicate, spirally grooved; sometimes the grooves are only perceptible between the plicæ, in others they decussate the latter into granules; sutural band nodulous; columella recurved, ridged; gray, brownish white or light yellowish, with usually a white-banded periphery. Length, 25–35 mill.

North Carolina to *West Indies.*

The certain synonyms are *T. rudis*, Gray (fig. 69), *T. Petiti.*

Kiener (fig. 64), and *T. Souleyeti*, Desh. (fig. 65). I think it probable that *T. larvæformis*, Hinds (figs. 66, 67), of the West Coast of Central America, should also be here referred; I cannot detect any specific differences. *T. Sowerbyana*, Desh. (Pl. 12, fig. 31), from West Africa, appears to be also identical.

T. Mariesi, E. A. Smith. Pl. 4, fig. 68.

Longitudinally costate, with traces of spiral lines, the costæ ending in tubercles below the also tuberculate sutural band; yellowish brown, variegated with reddish brown.

Length, 45 mill.

Japan.

Very closely allied to the preceding species, but narrower. The aperture appears to be imperfect in the specimen figured.

T. Jeffreysii, E. A. Smith. Pl. 4, fig. 60.

Longitudinal riblets about 20, fine, oblique, decussated by spiral striæ, about 5 on a whorl, the two uppermost striæ widest apart forming two nodulous bands next the suture; yellowish, dotted with light brown between the two series of nodules, and streaked with the same color beneath, body-whorl with a pale central zone. Length, 25 mill.

Japan.

This, the preceding and following species, should probably be united.

T. subtextilis, Smith. Pl. 4, fig. 70.

White; with about twenty costæ, and ten spiral striæ, three of the latter upon the nodulous sutural band. Length, 37 mill.

Japan.

See remarks under preceding species.

T. bifrons, Hinds. Pl. 4, fig. 71.

Fawn-brown, obscurely rufous-banded; whorls somewhat convex, encircled with four rows of pale granules, last whorl many-grained; sutural band only faintly indicated by a concavity, instead of a groove. Length, 2 inches.

Japan.

T. amœna, Deshayes. Pl. 5, fig. 73.

Turreted, rather narrow; yellowish, with red spots on the

sutural band; longitudinally closely plicate, spirally linearly grooved, the sutural band separated by a pricked groove.

Length, 35 mill.

China (Desh.); *N. Caledonia* (Brazier).

T. BLANDA, Desh. Pl. 5, fig. 72.

Shell transparent white, dotted with chestnut on the sutural band, apex purple; no revolving sculpture; aperture somewhat fusiformly produced below. Length, 30 mill.

Japan.

T. PULCHELLA, Deshayes. Pl. 5, fig. 74.

Light yellowish brown, stained with rust-color, with a white peripheral band; whorls concave, arcuately plaited, without spiral striæ, subsutural groove crenate. Length, 43 mill.

China.

T. TEXTILIS, Hinds. Pl. 5, figs. 75, 76.

Yellowish white; closely plicated, with fine spiral lines, with two bands of plicæ below the suture. Length, 35 mill.

Japan; Sts. Macassar; Sandwich Islands.

T. nodularis, Desh. (fig. 76), is a synonym.

T. CŒLATA, Adams and Reeve. Pl. 5, fig. 77.

Surface sharply granulated by longitudinal and spiral sculpture; transparent white. Length, 41 mill.

China.

Has the form of the preceding species, from which it is, perhaps, insufficiently distinguished by the non-development of the inferior band of tubercles.

T. TORQUATA, Ads. and Reeve. Pl. 5, fig. 78.

Longitudinal plicæ narrow, raised, interstices spirally striate-latticed; next the suture are two nodulous bands, separated by a sulcus, the periphery is subangulated and slightly nodulous on the angle, between this and the sutural band the surface is somewhat concave; fawn-colored, the sculpture lighter, a white band below the periphery. Length, 44 mill.

Japan.

A very distinct, beautiful species.

T. BICINCTA, Hinds. Pl. 5, fig. 79.

White; with thin longitudinal plicæ, and no spiral sculpture;

sutural band tuberculate, and with the plicæ below it cut into a couple of revolving rows of tubercles. Length, 28 mill.

Habitat unknown.

Described from a unique specimen in the Cumingian Collection.

T. COPULA, Hinds. Pl. 5, fig. 80.

Chestnut or olive-brown, plications paler, sutural band with oblique chestnut spots; no revolving sculpture; periphery with two indistinct narrow white bands. Length, 35 mill.

Guinea.

T. EXIGUA, Desh. Pl. 5, fig. 89.

Shell chestnut or chocolate-brown, strongly latticed by close sculpture; sutural band distinctly marked; aperture rather produced below. Length, 15–18 mill.

E. Coast of Australia; Andaman Is.

T. VENILIA, Tenison-Woods. Pl. 5, fig. 88.

Yellowish white, zoned with a pale chestnut line; whorls subcoronate, with narrow oblique curved plications, and more or less indistinct fine spiral striæ; subsutural area divided by a punctate groove. Length, 42 mill.

Port Jackson, N. S. Wales.

T. ROSEATA, Adams and Reeve. Pl. 5, fig. 90.

Interstices of the ribs linearly grooved, sutural band defined by a punctate groove; columella laminated, twisted; rose-color. Length, 28 mill.

Soolo and *China Sea.*

T. SWAINSONI, Deshayes. Pl. 5, fig. 81.

Light roseate, nearly white on the sutural band, the interstices of the ribs smooth, or obscurely striate, polished. Length, 20–32 mill.

Sandwich Islands.

Possibly identical with the preceding species. Pease has described a variety *inflexa*. The same author has described (but not figured) a *T. sulcata*, which he says may prove to be a distant form of *T. Swainsoni*.

T. ELATA, Hinds. Pl. 5, fig. 82.

Spirally linearly grooved between the longitudinal plications, the beaded sutural band separated by a well-impressed groove;

chestnut-white or brownish white, with a darker band below the periphery. Length, 23 mill.

Panama and *Bay of Montija*, *Cent. Am.*

T. CANCELLATA, Quoy. Pl. 5, figs. 83, 84, 86; Pl. 6, figs. 92–97, 100–3, 6.

Yellowish white, orange, chestnut or chocolate-color, the nodulous sutural band white, often with a white band below the periphery; plications close, rounded, curved, the narrow interstices closely striate; margins of aperture as well as the interior often stained with a darker color. Length, 44 mill.

Moluccas, *Philippines*, *Viti Isles*, *Sandwich Isles.*

M. Deshayes, supposing that the figure in the Thes. Conch. (fig. 83) does not represent this species, has called it *T. undatella*. *T. livida*, Reeve (fig. 86), appears to me to be a form of this species; it comes from the Philippines. *T. subangulata*, Desh. (fig. 92), described from a single specimen, also probably belongs here.

A slight variety is *T. columellaris*, Hinds (fig. 93), of which *T. areolata*, Adams and Reeve (fig. 94) is probably a synonym—as stated by Reeve, although Deshayes considers the two forms distinct.

I add as synonyms *T. flavescens*, Desh. (fig. 95); *T. approximata*, Desh. (fig. 96), which has ruder coarser sculpture, and is a stouter shell; *T. flava*, Gray (fig. 6), an immature shell; *T. lutescens*, E. A. Smith (fig. 97), founded on Sowerby's figure of *T. flava* in the Thes. Conch., which Mr. Smith considers specifically distinct from the figure in Reeve's Iconica; *T. puncticulata*, Desh. (fig. 100); *T. Peasei*, Deshayes (unfigured); *T. Hindsi*, Desh. (fig. 1); *T. Bruguieri*, Desh. (fig. 2); and *T. difficilis*, Desh. (fig. 3.)

T. UNDULATA, Gray. Pl. 6, figs. 4, 8.

Ribs rather large, rounded, close, with spiral striæ on the narrow interstices, sutural band well-marked, forming a slight, nodulous shoulder to the whorls; yellowish or orange, the interstices deeper-colored, appearing as though longitudinally strigate, band white, sometimes white-banded on the periphery; aperture rather narrow, the lips often stained with orange-red.

Length, 41 mill. *Viti Islands*, *Philippines.*

Perhaps a variety of the preceding. *T. picta*, Hinds (fig. 8),

is probably a synonym. *T. cinctella*, Desh., an unfigured species, is added by Reeve.

T. PERTUSA, Born. Pl. 6, figs. 5, 7.

Longitudinally finely plicate, interstices punctate spirally; orange-brown, the interstices of the tubercles on the sutural band chocolate. Length, 3 inches.

Darnley Isl., Australia.

T. Bermonti, Lorois (fig. 7), is a synonym. It is said to inhabit Tahiti.

T. NEBULOSA, Sowb. Pl. 6, fig. 9.

Longitudinal ribs rounded obtuse, close, curved, interstices spirally grooved, sutural band defined by a punctate groove; longitudinally clouded with reddish orange and white, with a white band on the periphery. Length, 3 inches. *Zanzibar.*

T. ALVEOLATA, Hinds. Pl. 5, fig. 87.

Longitudinal plicæ curved, the interstices spirally striate; flesh-color, stained with orange-brown, with a row of alternate chestnut and white spots on the sutural band, and another on the white-banded periphery. Length, 37 mill.

Straits of Malacca; Japan.

Var. GOTOENSIS, Smith. Pl. 5, figs. 85, 91.

Sculpture said to be finer than in *T. alveolata*, the band on the periphery unspotted. From Japan. It is very doubtful whether to these forms ought not to be united *T. amœna*, Desh.

T. POLYGYRATA, Desh. Pl. 7, fig. 10.

Closely ribbed, interstices linearly grooved, sutural band defined by a pricked groove; fulvous orange, white at the sutures, with a white band on the periphery. Length, 13 mill.

Philippines (Cuming); *Japan* (Smith).

A small shell with numerous whorls, perhaps not distinct from *T. cancellata.*

T. POLYGONIA, Reeve. Pl. 7, fig. 15.

Strongly varicosely ribbed, ribs rather distant, interstices concave, spirally linearly grooved, sutural band distinct; fulvous brown. Length, 10 mill.

Hab. unknown (Taylor Coll.).

I am not acquainted with this species.

T. RADULA, Hinds. Pl. 7, fig. 17.

Sutural band and whorls strongly tuberculated by decussating sculpture; reddish chestnut, white at the suture, with a white periphery-band. Length, 40 mill.

Puerto Portrero, W. Coast of Central America, 13 fms. (Cuming).

Described from a unique specimen in the Cumingian Collection.

T. VARICOSA, Hinds. Pl. 7, fig. 12.

Varicosely distantly ribbed, interstices striately grooved; whorls convex, constricted around the upper part, sutural band smooth or tuberculate; olive-brown, chocolate or white, banded on the periphery. Length, 28 mill.

Gulf of Papagayo, W. Coast of Central America, mud, at 23 fms. (Hinds).

T. TUBERCULOSA, Hinds. Pl. 7, fig. 31.

Shell rather thin, transparent ash, livid purple towards the apex, obscurely red-spotted next the suture; whorls slopingly flattened, conspicuously tuberculate on the sutural band, then smooth, and finally longitudinally tuberculated, forming an angulated periphery. Length, 2 inches.

Panama (Cuming); *San Blas* (Hinds).

T. PLICATA, Gray. Pl. 7, fig. 20.

Yellowish flesh-color; whorls slopingly flattened, the last swollen, longitudinally thinly plicated, spirally very finely prickly-grooved, sutural band distinct. Length, 2 inches.

Guayaquil, 7 fms., sandy mud (Cuming).

Appears to be distinguished chiefly by its stout form.

T. SPECILLATA, Hinds. Pl. 7, fig. 18.

Latticed by longitudinal and spiral sculpture, whitish, with a few large chestnut maculations; sutural margin irregularly chestnut-spotted. Length, 2 inches.

San Blas, W. Coast of Mexico.

Very closely allied to *T. dislocata*, Say, and to *T. cancellata*, Quoy, which are possibly identical.

T. CONSPERSA, Hinds. Pl. 7, fig. 13.

Whitish, irregularly chestnut-spotted on the sutural band,

and chestnut-banded at the base; plications thin, the interstices closely striate spirally. Length, 1 inch. *Philippines.*

T. FICTILIS, Hinds. Pl. 7, figs. 14, 11.

Whitish, purple-ash below the periphery, the latter appearing as a narrow band at the base of the spire-whorls.

Length, 15 mill. *Australia.*

A beautiful little species, well distinguished by its contrasted coloring. *T. bicolor*, Angas (fig. 11), is a synonym.

T. TAYLORI, Reeve. Pl. 7, fig. 22.

Rather stout towards the base, purple ash-color, livid, obscurely banded; sutural band yellowish. Length, 26 mill. *Torres Straits, Australia.*

The form is swollen below, resembling the preceding species.

T. MORBIDA, Reeve. Pl. 7, fig. 23.

Stoutly, closely plicate, the sutural band broadly defined by a groove; purplish flesh-color, encircled by faint red spots.

Length, 15 mill. *Hab. unknown.*

The spots do not appear upon Reeve's figure. The type specimen was in the Taylor Collection.

T. BREVICULA, Desh. Pl. 7, fig. 24.

Sutural band swollen, scarcely crenated, defined by a broad concave depression, below it the body-whorl is slopingly convex, somewhat angulated on the periphery, where it is somewhat distantly plicately tuberculated; lead-color, white-banded at the suture and on the periphery, the latter filleted with chestnut on both margins. Length, 23 mill. *Tasmania.*

T. PROTEXTA, Conrad. Pl. 6, fig. 98.

Whorls rather convex, with curved, sharp, numerous small plications, the interstices smooth or very minutely spirally striate, a sutural band is sometimes obscurely indicated, but is usually absent; chocolate, or dark brownish white, chocolate within the aperture. Length, 18–25 mill.

West Coast of Florida.

T. CONCAVA, Say. Pl. 7, figs. 25, 26.

Shell white; with a prominent row of nodules below the suture, and a less prominent row above it, the last forming a

peripheral row on the last whorl; between these two the surface is concave, obsoletely ribbed and finely spirally striated.

Length, 20 mill. *So. Carolina.*

T. frigata, Hinds (fig. 26), is probably a synonym; it is ascribed to Africa (Gray), and Galapagos Is. (Cuming): both localities need confirmation.

** *Whorls smooth.*

T. CORRUGATA, Lam. Pl. 7, figs. 21, 28, 32.

Fulvous cream or ash-color, with two or three bands of chestnut spots; sutural band often lighter-colored, with small chestnut spots, tuberculate. Length, 2·25–3 inches.

Loanda, W. Africa.

The synonyms are *T. regina*, Desh. (fig. 28), *T. bitorquata*, Desh. (fig. 32), and *T. punctata*, Gray.

T. TESSELLATA, Gray. Pl. 7, figs. 27, 19.

Shell whitish, with two rows of oblong chestnut or chocolate spots; whorls concavely flattened, decussated by fine ridges, the spiral ones stronger, suture bordered by two tuberculated bands.

Length, 35 mill. *Marquesas* (Hinds).

The description is drawn up from *T. ligata*, Hinds (fig. 19), which appears to be the typical form. *T. tessellata*, Gray, no locality, is from a single specimen in the British Museum; the whorls are said to be smooth, but the resemblance to Hinds' species, over which it has priority of description, is striking.

T. DECORATA, Desh. Pl. 7, fig. 16.

Whitish, with two series (on the body-whorl three) of chestnut quadrangular spots; whorls smooth, longitudinally striated, marginal band tuberculated. Length, 28 mill.

Pidang, Sumatra.

Reeve figures this species under the name of *T. tessellata*, Gray, which has a double band of tubercles.

T. HISTRIO, Desh. Pl. 7, fig. 29.

Yellowish, with waved longitudinal chestnut stripes, interrupted at the periphery; longitudinally striate, the striæ becoming plications upon the sutural band, where the surface is variegated with chestnut lines. Length, 45 mill. *Hab. unknown.*

*** *Cylindrically many whorled, whorls with revolving sculpture, with or without less prominent longitudinal striæ.*

T. MYUROS, Lam. Pl. 7, fig. 30.

Whorls flattened, closely scabrously latticed with striæ, the revolving striæ much the most prominent, above with two obliquely plicate sutural bands, the inferior one of which is often more or less obsolete; light yellowish brown, usually longitudinally striped with broad chestnut maculations.

Length, 4–5 inches.

Moluccas, New Ireland.

This may be *T. strigilata*, Gmel., in part, and is possibly also *T. commaculata*, Gmel. *T. scabrella*, Lam., is undoubtedly a synonym.

T. PRETIOSA, Reeve. Pl. 8, figs. 33, 34.

Whorls convexly flattened, arcuately striated by growth-lines, the interstices latticed, double-banded and tuberculated below the suture; yellowish, with broad chestnut longitudinal blotches.

Length, 5·5 inches.

China.

I think that *T. lima*, Deshayes (fig. 34), from same locality, is identical.

T. CINGULIFERA, Lam. Pl. 8, figs. 35–38.

Shell smooth, distantly spirally superficially grooved, grooves often minutely punctate, the upper groove a little deeper, indicating a sutural band, upon which the growth-lines become oblique and subplicate; yellowish flesh-color.

Length, 3·25 inches.

Philippines, New Ireland, Viti Islands, China.

The synonyms are *T. Chinensis*, Desh. (unfigured), *T. columnaris*, Desh. (unfigured), *T. pallida*, Desh. (fig. 36), *T. crenifera*, Desh. (unfigured), *T. punctatostriata*, Gray (unfigured), and *T. punctulata*, Sowb. (unfigured). *T. lævigata*, Gray (fig. 37), is a rather narrow form, and *T. obsoleta*, Desh. (fig. 38), is a wider specimen than usual, with a very faint indication of a brown band near the base.

T. TRICOLOR, Sowb. Pl. 8, fig. 39.

Shell smooth, yellowish flesh-color with three distant orange-

red revolving lines, one of them defining a sutural band, which is often white. Length, 2 inches.

Friendly Islands.

Closely related to both the preceding and following species—which may need to be united when we know more about them. *T. tæniolata*, Quoy, is a synonym.

T. Babylonia, Lamarck. Pl. 8, figs. 40, 41.

Flesh-red, overlaid more or less with white; smooth or spirally striated, with distant grooves, becoming closer at the base of the body-whorl, the grooves often darker-colored; aperture orange-brown. Length, 2·5 inches.

China, Viti Islands.

T. Deshayesii, Reeve (fig. 41), is a synonym.

T. straminea, Gray. Pl. 8, figs. 42–45, 47, 48.

Yellowish brown or livid ash-color, the upper sutural band generally lighter-colored; surface crossed by revolving grooves and striæ, the latter sometimes granulated by the intersection of growth-lines, the former rather distant; with two sutural bands, the upper one swollen, the inferior one much smaller, and both covered by oblique plications. Length, 2·5 inches.

Philippines, China.

Will probably prove to be a variety of the preceding species. It is *T. Babylonia*, var., of Kiener, *T. circinata*, Desh. (fig. 44), *T. acuta*, Desh. (fig 45), and *T. monilis*, Quoy (figs. 47, 48).

T. Cumingii, Desh. Pl. 8, fig. 49.

Sharply granosely cancellated throughout, with two tuberculated bands next the suture, the lower one much the smallest; straw-colored. Length, 3·75 inches.

China.

Probably only a variety of the preceding species.

T. fenestrata, Hinds. Pl. 8, fig. 46.

Strongly latticed throughout, with a crenated sutural band; transparent fulvous or fulvous brown. Length, 35 mill.

Hab. unknown.

This shell does not appear to have any marked specific character.

T. LÖBBECKEANA, Dunker. Pl. 8, fig. 50.

Whitish, tinged with light yellowish brown, with a wide, faint band of the latter color; subgranose by rather faint intersecting striæ; sutural band slightly separated by a groove.

Length, 75 mill. *Japan.*

T. SUCCINEA, Hinds. Pl. 8, fig. 51.

Whorls doubly banded below the suture, orange-red with two distant rows of small chestnut spots; closely arcuately wrinkled.

Length, 3·75 inches.

Philippines.

Dr. von Martens (Mauritius, 231) makes this a synonym of *T. monilis*, Quoy, to which it does not appear to me to be very closely related.

T. FORTUNEI, Deshayes. Pl. 8, fig. 52.

White, with slightly convex whorls, strongly longitudinally ribbed, the interstices latticed with spiral ridges, sutures deep, below them a band indicated by a pricked spiral groove.

Length, 69 mill.

China Sea.

A unique shell in the Cumingian Collection.

T. SEROTINA, Ads. and Reeve. Pl. 8, fig. 53.

Light brown, whorls spirally striately ridged, with two bands of nodules below the suture, the upper band the largest.

Length, 2 inches. *Japan.*

T. FUNICULATA, Hinds. Pl. 9, fig. 60.

Shell light chestnut-brown, sharply and closely spirally ridged, the two ridges nearest the suture wider. Length, 2 inches.

Marquesas Islands (Cuming).

T. Archimedis, Desh. (unfigured), is a synonym according to Reeve.

T. ALBOMARGINATA, Desh. Pl. 9, fig. 54.

Whorls flat, bright orange, upper part white, divided by a groove, each side of which is crenated, below the groove spirally ridged, the interstices pricked. Length, 1·75 inches.

China.

T. EXIMIA, Desh. Pl. 9, fig. 55.

Yellowish white, the sutural band dotted with orange-chestnut

and somewhat noduled; below the band are three granular ridges with pricked interstices; lower part of body-whorl striate.

Length, 1·75 inches.

Hab. unknown.

Described from a unique specimen.

T. AMANDA, Hinds. Pl. 9, fig. 61.

Orange-colored, with two white bands of tubercles below the suture, balance of the surface punctate, grooved. Length, 1 inch.

Straits of Macassar.

Described from two immature specimens. Perhaps = *T. straminea*, Gray.

T. TRISERIATA, Gray. Pl. 9, figs. 56, 57.

Fulvous white or straw-color, narrow, whorls numerous, flatly concave, spirally ridged, sometimes decussated by longitudinal sculpture, with two bands of nodules below the suture, and a single smaller row on the periphery of the last whorl.

Length, 2–4 inches.

Philippines (Cuming), *Port Curtis*, *Australia* (Stutchbury).

The latter locality is for *T. prælonga*, Desh. (fig. 57), which does not appear to me to differ.

C. *No sutural band, closely striate or plicate next the suture; balance of whorl smooth or plicate.*

T. CÆRULESCENS, Lam. Pl. 10, figs. 75–77; Pl. 9, fig. 66.

Shell smooth, without infra-sutural band, but usually with a narrow callous deposit forming a more or less defined band *above* the narrow sutural groove; whitish, spotted or clouded with chocolate below the suture, the clouds sometimes forming a wide band, or covering the upper half of the body-whorl, or even extending to the base; when well covered with chocolate there is often a lighter band upon the periphery.

Length, 1·5–2·5 inches.

Australia; Philippines; Polynesia; Mauritius; Red Sea.

The whorls are flattened, and scarcely impressed at the sutures. This species is the type of Mr. E. A. Smith's subgenus Impages, characterized by the callous deposit above the sutures; but this peculiarity is not even constant in this species, and is rare or not

developed in the other species which Mr. Smith refers to the group.

It is *T. niveum* and *T. edentulum*, of Gmelin, *T. bifasciatum*, Dillw., *T. fusca*, Martyn (in part), *T. Otaiensis*, Lesson, *T. hecticum*, Linn. (teste Hanley). Von Martens calls Kiener's fig. 12 *d* var. *flammulata;* another variety is *T. nimbosa*, Hinds, from the Red Sea (fig. 66).

T. CINEREA, Born. Pl. 9, figs. 67, 58, 59, 62–65, 68–74; Pl. 10, fig. 78.

Shell smooth, but closely, minutely longitudinally plicated beneath the sutures; yellowish ash-color, lighter upon the sutural plications—where there are sometimes light chestnut spots arranged in a single series, usually faintly whitish-banded at the periphery; aperture light chestnut-color, showing the light band.

Length, 1·5–2·25 inches.

W. Africa, *West Indies*, *Japan*, *Philippines*, *Polynesia*.

The distribution of this species is nearly world-wide in warm seas. I have endeavored in vain to find distinguishing characteristics for the species which, under various names have been assigned to distant localities, but I am compelled to follow Reeve in classing them all as synonyms. This large synonymy includes *T. Jamaicensis*, C. B. Ad. (fig. 58); *T. strigilata*, var., Gmel.: *T. stylata*, Hinds (fig. 59), from Philippines; *T. laurina*, Hinds (fig. 63), from W. Africa; *T. castanea*, Kiener (fig. 68), also from W. Africa; *T. aciculina*, Lam. (not of Reeve or Hinds); *T. micans*, Hinds (fig. 64), Reeve, in part—some of his figures representing *T. cuspidata*, Hinds; *T. Adansoni*, Desh. (unfigured, but; said by Reeve, who saw the type, to = *micans*); *T. apicina*, Desh. (fig. 69), from Singapore; *T. dispar*, Desh. (fig. 70); *T. Philippiana*, Desh. (fig. 62), Philippines; *T. bacillus*, Desh. (figs. 65, 71), Sandwich Isles, and *T. lactea*, Desh. (fig. 72), a colorless state of the same; *T. acuminata*, Gray (fig. 73); *T. Salleana*, Deshayes (fig. 78), Mexico, Haiti; and *T. parva*, Baird (fig. 74), from New Caledonia. The figure of the last-named species does not show the superior plications, but the text describes them.

Var. CUSPIDATA, Hinds. Pl. 10, figs. 80, 79.

Whitish or tinged with light yellow, the light band on the

periphery scarcely distinguishable, but below it a narrow chestnut band.

West Coast of Africa.

T. Traillii, Desh. (fig. 79), from the Indian Ocean, is a very similar shell, and may connect this variety with the type.

T. ACICULINA, Reeve. Pl. 10, figs. 81, 82.

Shell evenly plicate, the plicæ small, short, or usually covering the entire shell; aperture peculiarly broadly dilated at the base; usually chocolate or ash-color, white-banded at the suture, and on the periphery of the body-whorl, the interstices of the plications reddish chestnut on the margins of the bands, as if fasciculated; sometimes the general color is pale, almost white, deepened here and there, especially below the peripheral white band, so as to appear like a colored band; interior chestnut-red, white-banded. Length, 1·5 inch.

Singapore, *Manilla*, *Marquesas*, *Sandwich Isles.*

Usually distinguished by color, longer plications, broad base, smaller size, from the preceding species. Reeve has figured and described it as *T. aciculina*, Lam., but Mr. E. A. Smith has shown that Lamarck's species is really *T. cinerea*, Born. Hinds, on the other hand, has referred the present species to *T. cinerea*, for which he figures it. Mr. Smith has thought fit to impose a new name, *T. confusa*, which appears to me to be quite unnecessary, as, even if the name *aciculina* cannot be used, as of Reeve, not Lamarck, there is another, older name given to the species, *T. inconstans*, Hinds (fig. 82). I prefer to retain *aciculina*, because the species is universally known under that name. The unfigured *T. Matheroniana*, Desh., was referred by Reeve, in his Iconica, both to this species and to *T. strigilata*, but in his index he removes it from the synonymy of the latter. Pease considers it a synonym of *strigilata*, and not of *aciculina*, and Smith believes it to be a distinct species. In the absence of a figure, I have no means of arriving at a judgment upon the matter, further than that the description appears to apply best to *T. strigilata*. *T. anomala*, Gray, was here referred by Reeve, but it differs in having a sutural band, defined by a groove.

T. LUCTUOSA, Hinds. Pl. 10, fig. 83.

Shell narrowly subulate, smooth, with fine spiral striæ under

the lens, puckered at the sutures into close, small longitudinal plications; deep chocolate-colored, including the interior of the aperture. Length, 1·25–1·75 inches.

Gulf of Nicoya to *Mazatlan*, *W. Coast of N. America.*

Reeve makes this a synonym of *T. cinerea*, Born; but it is more subulate, the color uniform, the plications smaller, closer, longer and more waved. None of the specimens before me show any bands.

T. STRIGILATA, Linn. Pl. 10, figs. 84, 85, 88.

Shell highly polished, regularly flatly longitudinally plicate, the plicæ usually extending below the middle of the body-whorl; fawn or ash-color, white-banded at the suture, with a row of square chestnut spots on the band; body-whorl white-banded at the periphery and darker-colored below the band; aperture rather narrowed below; chestnut, with a median white band.

Length, 1·25–1·75 inches.

Polynesia, *Sandwich Islands.*

A narrower, more cylindrical species than *T. cinerea*, from which it differs also in its regular, longer, coarser plications, and brighter coloring. It has several synonyms: *T. strigilata* (*striatula*), Kiener, in part, *T. Argenvillei*, Desh. (unfigured), *T. acumen*, Desh. (unfigured), *T. modesta*, Desh. (unfigured), mouth of the Indus; all made synonyms by Reeve, who examined the types; *T. concinna*, Dillwyn (not Deshayes), *T. Verreauxi*, Desh. (fig. 85), *T. Matheroniana*, Deshayes (see remarks p. 32). *T. lepida*, Hinds (fig. 88), must also be added, although Hinds thought it sufficiently distinguished by the absence of a white sutural band, and by its sharper plications.

T. LAUTA, Pease. Pl. 10, fig. 91.

Subcylindrical, longitudinally, straightly plicate, the plicæ regular, sharp, extending across the whorls, the interstices with a single row of punctures near the suture; leaden gray to orange-brown, polished, banded with yellow, bearing a row of chestnut spots at the suture, with a pale peripheral band, beneath which the body-whorl is chestnut-colored.

Length, 1 inch.

Sandwich Islands.

Figured from a type-specimen. It may be only a strong

variety of *T. strigilata*, but has sharp plications and the line of punctures which indicate a sutural space, although no division is defined upon the ribs.

T. HASTATA, Gmelin. Pl. 10, fig. 87; Pl. 9, fig. 86; Pl. 10, figs. 89, 90, 94, 95, 92.

Elongately cylindrical, somewhat acuminated towards the apex; closely plicated, forming crenulated sutures, the plicæ sometimes on the upper part of the whorls only, sometimes covering the whorls to the base; whitish, two- or three-banded with fawn-color to orange-brown, the bands sometimes broken up into large blotches; the entire surface occasionally uniform orange-brown. Length, 1–1·2 inches.

West Indies; West Africa.

T. costata, Menke (unfigured) is a synonym; as is also the West African *T. Knockeri*, Smith (fig. 86.)

Var. ALBULA, Menke. Pl. 10, figs. 89, 90, 94, 95.

Shell narrower in proportion to its length, more subulate, the plications short.

Australia, *Philippines*, *Straits of Malacca.*

As the specimens usually occur this variety presents sufficient distinctness of form for specific rank, but sometimes the West Indian shells are found exactly like it. Reeve, who does not even make a varietal distinction, includes also the unfigured *T. crassula*, *T. bipartita*, and *T. incolor* of Deshayes, and as he has examined the types, he is probably correct. *T. casta*, Hinds (fig. 90), and *T. mera*, Hinds (figs. 94, 95) are synonyms.

Var. SOLIDA, Deshayes. Pl. 10, fig. 92.

The plications are described as only indicated by impressed striæ on the last whorl, which is encircled by three translucently yellowish lines.

Japan.

Reeve adds that the shell is tessellately enameled throughout with square opaque white blotches on a fawn-cream color surface; which appears to me to be but an exaggerated way of describing the characteristics exhibited by the figure.

T. NITIDA, Hinds. Pl. 10, figs. 93, 96.

Shell narrowly subulate, whitish or fawn-color, coarsely plicate, the plicæ narrow, the interstices with a single row of punctures below the sutures. Length, 1 inch.

Marquesas Is.; *Australia.*

T. plicatella, Desh. (fig. 96), is a synonym.

T. CALIGINOSA, Desh. Pl. 10, fig. 97.

Shell slender, varicosely ribbed; dark chocolate.

Length, 1·25 inches.

Philippines.

Founded on a single specimen in the Cumingian Collection. It may = the preceding, but punctured interspaces are neither figured nor described.

Dr. von Martens refers here the unfigured *T. Kirki*, Hutton, of New Zealand.

T. VIOLASCENS, Hinds. Pl. 10, fig. 98.

Slenderly turreted, whorls flatly convex, obliquely flexuosely plicated; spirally striate in the interstices, suture rather deeply impressed; whitish, pale violaceous or yellowish, brown-stained at the suture. Length, ·83 inch.

Philippines.

Reeve remarks that Hinds' original figure in the "Thesaurus" is inaccurate, representing a sutural band—of which there are no indications on any of the specimens.

T. TANTILLA, E. A. Smith. Pl. 11, fig. 4.

Longitudinally arcuately ribbed, subtuberculate at the sutures; yellowish, with a sutural chestnut band, and another on the periphery of the last whorl. Length, 6·5 mill.

Japan.

Mr. Smith makes his *T. pumilio* (unfigured) a synonym of the above. It appears to me to be too closely related to the next species.

T. TENERA, Hinds. Pl. 10, fig. 99.

Distantly, strongly varicosely ribbed, interstices concave, shining; yellowish brown, chestnut-banded at the sutures and on the periphery. Length, 8 mill.

Ceylon. Straits of Malacca.

T. TRISTIS, Deshayes. Pl. 10, fig. 100.

Whorls convex, plicately ribbed; yellowish white with a chestnut band at the suture, and another at the periphery.

Length, 18 mill.

Japan.

The unfigured *T. Antarctica*, Smith, is referred here by Mr. Gillies, who makes it a New Zealand shell; he also adds to the synonymy *T. Kirki*, Hutton—which Dr. von Martens refers to *T. caliginosa*, Reeve.

T. ASSIMILIS, Angas. Pl. 11, fig. 1.

Whorls somewhat convex, broadly arcuately ribbed, ribs ceasing at the periphery of the last whorl; yellowish brown, chestnut-banded at the suture, lower part of body-whorl chestnut.

Length, 11 mill.

Port Jackson, Australia.

T. PYGMÆA, Hinds. Pl. 11, fig. 2.

Shell solid, closely ribbed; yellowish brown, chestnut-banded at the sutures and on the periphery. Length, 7 mill.

Straits of Malacca, 17 fathoms, mud (Hinds).

T. NANA, Deshayes. Pl. 11, fig. 3.

Yellowish white, with two interrupted bands of chestnut spots, one of them visible on the spire, distantly ribbed, the ribs gradually disappearing. Length, 10 mill.

Mouth of the Indus.

T. METCALFEI, Reeve. Pl. 11, fig. 5.

Shell cylindrically oblong, whitish, faintly tinged with pale white-dotted orange flames, red-dotted at the sutural margin; whorls convex, the first ribbed, ribs soon fading.

Length, 12 mill.

West Indies?

Described from a single specimen collected by Rev. L. Guilding.

T. OBESA, Hinds. Pl. 11, fig. 6.

Cylindrically subulate, whorls convex, the first ribbed, ribs soon disappearing; shining white, with longitudinal orange blotches, interrupted by a white band on the periphery.

Length, 12 mill.

Hab. unknown.

T. PLUMBEA, Quoy. Pl. 11, fig. 7.

Longitudinally plicate, plications straight; fawn or lead-color, white-banded at the suture; sometimes a white band at the periphery of the last whorl, below which the color is darker.

Length, 1 inch.

Moluccas, *Philippines*, *China*, *Australia*.

The unfigured *T. Bourguignati*, Desh., is referred here by Reeve.

T. LISCHKEANA, Dunker. Pl. 12, fig. 22.

Distantly costate throughout, with an obsolete sutural band, barely defined by a narrow sulcus, and punctations in the interstices of the ribs; yellowish, banded with chestnut.

Length, 34 mill.

Japan.

Connects this group with those species having a sutural band, and is evidently closely related to *T. plumbea*, etc.

Subgenus EURYTA, H. and A. Adams.

T. ACICULATA, Lam. Pl. 11, figs. 15–17.

Spire and upper part of body-whorl plicate and shelving, usually doubly nodose, the two rows separated by a sulcus on the middle of the shelf, sometimes the lower row of nodules are developed into spines, lower part of body-whorl with revolving striæ; white, or broadly or narrowly banded with chocolate, or uniform chocolate, or with close zigzag longitudinal markings.

Length, ·75–1 inch.

Mazatlan, *Cape St. Lucas*, *Panama*, *West Indies*, *? W. Coast of Africa*, *? Mediterranean Sea*.

The American localities are certain, but the several records of Mediterranean specimens refer to beach-worn shells, and it is probable that they were introduced accidentally, and that the species does not live there. The figures will show how variable the shell is in its sculpture and coloring. It is by no means certain that it is really the species intended by Lamarck, although it is thus generally identified; neither is its generic position

fixed; as von Martens remarks (Don Bism., 27) it may very well be a Columbella.

It is *Bucc. pulchellum*, Calcara; *Mitra Linnei*, Eichwald; *Bucc. Linnei*, Payr.; *T. Cosentini*, Phil.; *T. nodosoplicata*, Dunker.

T. FULGURATA, Phil. Pl. 11, figs. 18–20.

Narrowly fusiform, spire acuminated, whorls plicate above, but not shouldered, with lightly marked, rather distant spiral striæ; whitish, with zigzag longitudinal chestnut lines.

Length, 14 mill.

Mazatlan, Acapulco, L. California.

T. arguta, Gould, and *T. rustica*, Hinds (figs. 19, 20), are synonyms; the coloring of the latter is often seen in the species, as well as orange-brown and even clear white without markings. Another usual state has the upper half of the whorls white, the lower half of the body-whorl only showing the lightning-streaks of chestnut.

T. NASSOIDES, Hinds. Pl. 12, fig. 23.

Whorls varicosely ribbed, spirally minutely striated; pinkish ash, banded with lead-color, margin below the suture white.

Length, 13·5 mill.

Red Sea (Lord Mountnorris).

Appears to be closely allied to the preceding species. I have not seen it.

T. TRILINEATA, Adams and Angas. Pl. 12, fig. 24.

Thin, slender, with long, narrow aperture, distantly plicate and encircled with thread-like lines; yellowish white, with longitudinal pale undulating chestnut markings, a series of chestnut spots near the suture, and on the body-whorl three revolving chestnut lines, one of which appears also on the spire.

Length, 14 mill.

New South Wales, Australia.

T. ANGASI, Tryon. Pl. 12, figs. 25, 26.

Olivelliform, with small, rather close plications, disappearing on the upper part of the body-whorl; whitish, shining, with three

fulvous bands upon which are longitudinal light chestnut zigzag markings. Length, 10–12 mill.

Rapid Bay, So. Australia; N. S. Wales.

Described by Adams and Angas under the name of *Euryta pulchella*, preoccupied in Terebra by Deshayes. *T. Brazieri*, Angas (fig. 26), appears to be only a slightly differently colored specimen. Angas has himself preoccupied this specific name in Terebra.

Unfigured and Undetermined Species of Terebra.

Buccinum acus, Gmel. (Acus sartoria, Martini); B. succinctum, Gmel.; B. obliquum, Gmel.; B. chalybæum, Gmel.; B. sinuatum, Linn.; B. proximatum. Linn.; B. hecticum, Gmel.; B. geminum, Linn.; B. monile, Linn.; B. murinum, Linn. (= Triton?). Most of these are Terebræ, but indeterminable.

T. elegans, Küster; T. costata, Küster; T. Sandwizensis (?). T. lineolata, Sowb.; T. granulosa, Lam.; T. polita, Gray; T. Buccinulum, Desh.; T. Buccinoidea, Blainv.; T. lineolata, Chemn., are all species of Bullia.

T. nubeculata, Sowb.; T. cancellata, Gray; T. alba, Gray.

The following are described (but not figured) by Mr. E. A. Smith:—

T. fuscobasis, T. MacAndrewi, T. Persica, T. Pellyi, T. tricincta, T. cognata, T. fuscocincta (all from the *Persian Gulf*); T. rufopunctata (*Hab. unknown*); T. bathyraphe, T. albozonata, T. melanacme, T. Japonica, T. granulosa (= T. pustulosa), T. Adamsi (all from *Japan*); T. Brasiliensis (*Rio Janeiro*); T. Australis and T. turrita (*N. Australia*); T. Capensis (*Cape of Good Hope*); T. miranda (*Malacca*); T. Macgillivrayi (*N. Guinea*); T. Fejiensis and T. paucistriata (*Fiji Islands*); T. Belcheri = Guayaquilensis (*Guayaquil*); T. Grayi (for T. gracilis, Gray), T. concolor, T. contracta, T. similis (*habitats unknown*).

W. H. Pease has described:—

T. suffusa, T. sculptilis, T. rosacea, T. assimilis (= T. contigua), T. propinqua, T. costellifera (all *Sandwich Islands*).

T. Dunkeri, Desh. (*T. eburnea*, Dunker, not Hinds), *Hab.?* T. continua, Desh., *Hab.?* Reeve's figure does not correspond with the description.

T. Belcheri, Phil.; T. subdivisa, Phil.; T. decussata, Phil. (*hab. unknown*).

T. tuberosa, Hinds, *Hab.?* The figure appears to represent a Cerithium with imperfect aperture.

T. Beddomei, Petterd. *Tasmania.*

T. bipartita, Gould (*Hakodadi*); T. prolixa, Gld. (*China*).

T. lævis, Gray. Worn and indeterminable.

T. pachyzona, Mörch. *Real Llejos.*

T. Lauretanæ, Tenison-Woods. *Port Jackson, Australia.*

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32. Terebra corrugata, var. bitorquata, Desh. Kiener, Iconog., t. 13, f. 31 *a*, ... 26

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33. Terebra pretiosa, Reeve. Conch. Icon., f. 30 *a*, . . 27
34. Terebra lima, Desh. (= pretiosa, Rve.). Jour de Conch., 2d ser., ii, t. 4, f. 2, ... 27
35. Terebra cingulifera, Lam. Sowb., Thes. Conch., f. 24, 27
36. Terebra pallida, Desh. (= cingulifera). Jour. de Conch., 2d ser., ii, t. 4, f. 3, ... 27
37. Terebra lævigata, Gray (= cingulifera). Thes. Conch., f. 93, ... 27
38. Terebra obsoleta, Desh. (= cingulifera). Reeve, Icon., f. 107, ... 27
39. Terebra tricolor, Sowb. Thes. Conch., f. 82, . . 27
40. Terebra babylonica, Lam. Sowb., Thes. Conch., f. 67, 28
41. Terebra Deshayesii, Reeve (= babylonica). Reeve, Icon., f. 45, ... 28
42, 43. Terebra straminea, Gray. Sowb., Thes. Conch., f. 22, 23, ... 28
44. Terebra circinata, Desh. (= straminea). Jour. de Conch., 2d ser., ii, t. 4, f. 6, ... 28
45. Terebra acuta, Desh. (= straminea). Ibid., t. 4, f. 4, . 28

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46. Terebra fenestrata, Hinds. Reeve, Icon., f. 114, . . 28
47, 48. Terebra monilis, Quoy (= straminea). Thes. Conch., f. 65, 66, ... 28
49. Terebra Cumingii, Desh. Jour. de Conch., 2d ser., ii, t. 3, f. 1, ... 28
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51. Terebra succinea, Hinds. Sowb., Thes. Conch., f. 40, . 29
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53. Terebra serotina, Ads. and Reeve. Conch. Icon., f. 66, 29

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54. Terebra albomarginata, Desh. Conch. Icon., f. 65, . 29
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56. Terebra triseriata, Gray. Sowb., Thes. Conch., f. 119, 30
57. Terebra prælonga, Desh. (= triseriata). Conch. Icon., f. 28, ... 30
58. Terebra Jamaicensis, C. B. Ad. (= cinerea). Specimen, 31
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61. Terebra amanda, Hinds. Thes. Conch., f. 100, . . 30
62. Terebra Philippiana, Desh. (= cinerea). Conch. Icon., f. 153, ... 31
63. Terebra laurina, Hinds (= cinerea). Thes. Conch., f. 27, ... 31
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65. Terebra bacillus, Desh. (= cinerea). Conch. Icon., f. 134 *a*, ... 31
66. Terebra nimbosa, Hinds (= cærulescens, var.). Conch. Icon., f. 37, ... 30
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79. Terebra Traillii, Desh. (= cinerea, var. cuspidata). Conch. Icon., f. 142, ... 31
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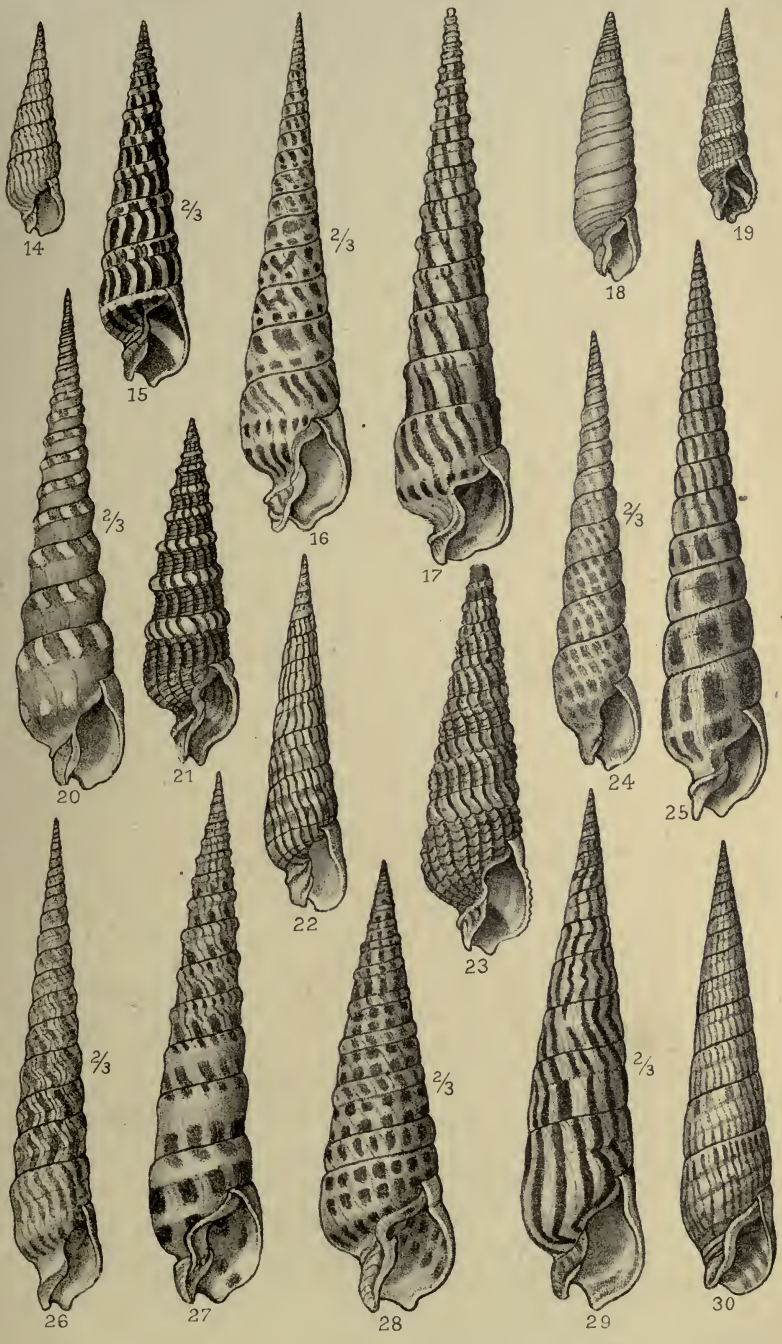
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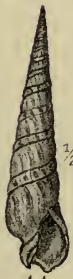
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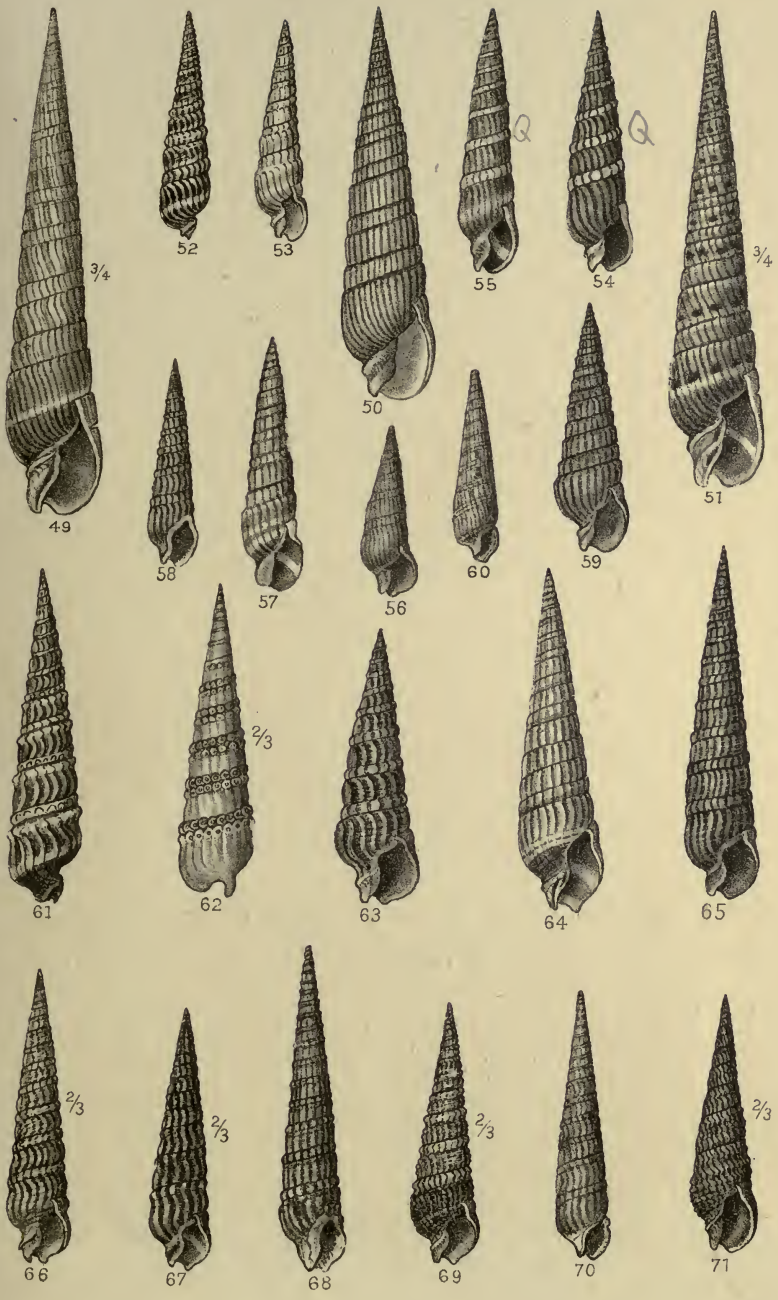
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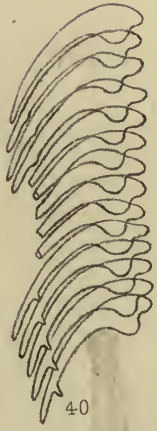
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Family *CANCELLARIIDÆ*.

In the "Structural and Systematic Conchology," ii, 180, I have given diagnoses of the family, of the genera Cancellaria and Admete, and of the several subgenera. The latter, as far as the recent groups are concerned, are the same as given by H. and A. Adams in their "Genera of Recent Mollusca," a classification mainly original with those authors. Several fossil subgenera are also described and illustrated in my above-named work, and need not be reproduced here; among the present illustrations, however, will be found one of a lingual tooth of Admete, as a type of the dentition of the family (Pl. 7).

As is frequently the case with the subgenera of Messrs. Adams, the study of extensive suites of species of Cancellariidæ proves these to possess little value for classification. Dr. Paul Fischer in his excellent "Manuel de Conchyliologie" has recognized this fact, and has reduced several of these subgenera of Messrs. Adams to the rank of sections.

Fischer proposes the following classification:

Subgenus Cancellaria, *s. stricto.* Shell cancellated, aperture oval, canal very short; columellar plications nearly central, strong, oblique (*C. cancellata*, Linn.).

Sections, I. Euclia. Shell smooth (*C. solida*, Sowb.). II. Narona. Shell cancellated, basal canal rather long (*C. Mitræformis*, Sowb.). III. Massyla. Shell fusiform, retracted in front (*C. corrugata*, Hinds).

Subgenus Merica, H. and A. Adams. Shell oval, whorls reticulated; aperture oval, lip not contracted in front, columella obliquely truncate at the base, imperforate (*C. melanostoma*, Sowb.). The subgenus Aphera only differs by its thicker lip and more spreading columellar callosity (*C. tessellata*, Sowb.).

Subgenus Trigonostoma, Blainv. Shell widely umbilicated, whorls angulated, aperture trigonal, lip not contracted in front (*C. trigonostoma*, Desh.). The genus *Turbinopsis*, Conrad, differs from *Trigonostoma* in having a single basal plication of the columella.

Subgenus Admete, Kroyer. Shell oval, thin, diaphanous, with epidermis, spire sharp, last whorl slightly ventricose; aperture oval, feebly sinuated in front, columella obliquely truncate, subplicate in front, lip sharp (*A. viridula*, Fabr.).

Subgenus Admetopsis, Meek. Anterior plication of the columella more elevated than the posterior one; lip thick; shell otherwise resembling Admete (*A. gregaria*, Meek).

In the present work I have ranged all the groups under one genus Cancellaria, regarding Admete as the only recent subgenus. The typical Cancellariæ are thus classified:

Section Cancellaria (= S. G. Cancellaria and Merica of Fischer).

Subsections Euclia; Merica (including Massyla and Aphera); Narona.

Section Trigonostoma (= S. G. Trigonostoma of Fischer).

Descriptions of the animals of *Cancellaria Spengleriana*, *C. cancellata*, and *Admete viridula*, will be found under those species in my text.

Seventy-eight recent species are enumerated by Messrs. Adams; thirty by Kiener (Coq. vivantes); sixty-eight by Sowerby (Thesaurus Conchyliorum); eighty-three by Reeve (Conchologica Iconica); Crosse ("Etude sur le genre Cancellaire," Jour. de Conch., 220, 1861) has ninety-three recent and eighty-one fossil species. Kobelt has commenced a monograph of the genus in Küster's Conchylien Cabinet; only a few pages and figures have as yet appeared.

One hundred and seventy-four specific names enter into the present work, of which seventy-seven are recognized as valid species, twenty-three are classed as doubtful and unidentified; the balance are considered synonyms.

Genus CANCELLARIA. Lam.

Section Cancellaria, *s. stricto.*

C. Cassidiformis, Sowb. Pl. 1, fig. 1.

Orange-fulvous or flesh-color, often indistinctly light-banded on the middle of the body-whorl. Length, 1·5–2·5 inches.

Panama to *Gulf of Mexico.*

C. Spengleriana, Desh. Pl. 1, figs. 2, 3, 4, 5.

Whorls spirally linearly grooved; yellow-brown, tinged with chestnut, particularly on the shoulder, body-whorl often light-banded in the middle. Length, 1·5–2·25 inches.

China, *Japan*, *Philippines*, *Australia*.

The synonyms are *C. Tritonis*, Sowb. (fig. 3), and *C. undulata*, Sowb. (figs. 4, 5). The latter has usually been considered a distinct species, but in a series of specimens the differential characters merge.

The animal is thus described by Mr. Arthur Adams: "Tentacles broad, flat, triangularly subulate, wide apart, separated by the base of the retractile proboscis. The eyes are small and black, and are placed on slight tubercles at the outer bases of the tentacles. The mantle is furnished with a small siphonal fold. The foot is large, flat, truncate in front, with short side-angles, and acuminate and produced behind.

"The tentacles of this species are rendered dark nearly as far as the eyes by close-set small red-brown dots; the siphonal fold of the mantle is sparsely spotted with the same; both dorsum and sole of the foot are reticulate with red-brown lines, and dotted with the same color.

"The animal is very shy, rarely showing more than the tips of the tentacles beyond the front edge of the shell. It has the power of considerably extending the fore part of the foot, using it as an exploring organ" (*Ann. Mag. N. Hist.*, 3d ser., xiii, 143).

C. Buccinoides, Sowb. Pl. 1, figs. 6–8.

Flesh-color to dark chocolate, frequently white-banded on the middle of the body-whorl; rudely decussated by longitudinal and spiral ribs, the intersections often nodulous.

Length, 1·5–2 inches.

West Coast of Central America.

C. corrosa, Reeve. Pl. 1, fig. 9.

Whorls latticed by longitudinal and spiral ridges, the intersections prickly, narrowly umbilicated. Light fulvous.

Length, 23 mill. *China Seas.*

This was originally described by Adams as *C. clathrata*, a name preoccupied by Lamarck.

C. NODULIFERA, Sowb. Pl. 1, fig. 10, 11.

Yellowish or orange-brown, often with a narrow white band towards the base; plaits very small. Length, 1·75–2 inches.

Japan.

This is *C. imperialis*, Michelin (fig. 11).

C. CUMINGIANA, Petit. Pl. 1, fig. 12; Pl. 2, fig. 13.

Orange-brown; undulately obsoletely thick-ribbed longitudinally, spirally ridged and grooved. Length, 1·25–1·75 inches.

Payta, Peru.

An interesting dwarf form with thick shell is figured by Crosse (fig. 13); it apparently connects this with the next species.

C. OBTUSA, Desh. Pl. 2, fig. 14.

Longitudinally somewhat obsoletely plicate, regularly spirally grooved and ridged; yellowish fawn-color. Length, 28 mill.

Hab. unknown.

The unique specimen formed part of the Cumingian Collection. Mörch has evidently mistaken its characters in referring it to *C. solida*, Sowb. See remark under preceding species.

C. SEMPERIANA, Crosse. Pl. 2, fig. 15.

Flesh-brown, faintly light banded at the periphery and base; the longitudinal costæ small, distant and somewhat irregular. Length, 37 mill.

New Caledonia.

Crosse compares it to *C. undulata* (= *Spengleriana*, var.), but it appears to be sufficiently distinct.

C. GRANOSA, Sowb. Pl. 2, fig. 16.

Slightly shouldered, clathrate and granose; orange-fawn to chestnut-color. Length, 34 mill.

Southeast and South Coast of Australia.

C. OBESA, Sowb. Pl. 2, figs. 17–19.

Whorls spirally flat-ribbed and grooved, the sculpture fading out on the body-whorl of adult shells, the earlier whorls decus-

sated by fine longitudinal ribs; columellar plaits very prominent; orange-brown, often indistinctly bifasciate with a lighter tint.

Length, 1·5–2·25 inches.

West Coast of Central America, northwards to Gulf of California.

The synonyms are *C. ovata*, Sowb. (fig. 18), and *C. acuminata*, Sowb. (fig. 19). The latter figure shows a more exserted spire, but there are intermediate forms connecting the three.

C. URCEOLATA, Hinds. Pl. 2, fig. 20.

Slightly, narrowly shouldered; fulvous straw-color to orange-brown. Length, 34 mill.

West Coast of Central America to *Mazatlan.*

Appears to differ from the preceding species mainly by the development of fold-like ribs, which traverse the body-whorl as well as the spire.

C. CANDIDA, Sowb. Pl. 2, fig. 21.

Whorls slightly round-shouldered at the suture; yellowish white. Length, 32 mill.

Polynesia.

C. AUSTRALIS, Sowb. Pl. 2, fig. 22.

Whorls rounded, decussated by close-set oblique longitudinal ribs, and spiral ridges; plaits three, moderate; yellowish white. Length, 23 mill.

New South Wales.

C. ALBIDA, Hinds. Pl. 2, fig. 23.

Whorls slantingly shouldered, reticulated by corded ridges; whitish; columella with the two superior plaits prominent. Length, 31 mill.

West Coast of Central America.

C. GEMMULATA, Sowb. Pl. 2, fig. 24.

Globosely ovate, solid, whorls scarcely angulated above; plaits three, subequal, moderate; whitish. Length, 1 inch.

West Coast of Central America.

C. RETICULATA, Linn. Pl. 2, figs. 25, 26.

Whorls spirally grooved and ribbed, the ribs low, flat, alternately narrower and wider, crossed by less prominent obliquely longitudinal ribs, sometimes forming obtuse granulations at the

intersections; sometimes the longitudinal ribs are more distant, or give place to undulations, which are more prominent near the suture; plaits two, strong, raised, narrow; yellowish white, banded and variegated with rust-brown. Length, 1·5–2·5 inches.

West Indies, Florida.

I think that *C. Eburnæformis*, Reeve (fig. 26), described without locality, is only a rather smooth form of this species.

C. DECUSSATA, Sowb. Pl. 2, figs. 27, 28.

Cancellated by narrow, prominent, corded ridges; columella with three moderate plaits; fawn-color to reddish brown.

Length 1·5 inches.

West Coast of Central America.

C. ventricosa, Hinds (fig. 28) is a synonym.

C. INDENTATA, Sowb. Pl. 2, fig. 29; Pl. 3, figs. 30, 32.

Somewhat squarely oblong, narrowly shouldered, scarcely umbilicated, latticed by longitudinal and spiral narrow, raised ridges; plaits two, prominent; deep orange-brown.

Length, 1·25 inches.

Panama.

C. cremata, Hinds (fig. 29), appears to be a variety; Reeve has described it or a similar form as *C. affinis* (fig. 32). This latter agrees well with the description of an unfigured species described also under the name of *C. affinis*, by Prof. C. B. Adams, and obtained by him at Panama.

C. GRAYI, Tryon. Pl. 3, fig. 33.

Spire exserted; rudely decussated with rough ridges and spiral striæ; reddish brown, the body-whorl obscurely two-banded with white; columella with three moderately strong plaits. Length, 1·75 inches.

Baclayon, Island of Bohol, Philippines;
17 fms. (Cuming).

Confounded by Sowerby with *C. asperella*, Lamarck, an error repeated by Reeve. I have named it after Dr. J. E. Gray, one of the earlier monographers of the genus Cancellaria.

C. CANCELLATA, Linn. Pl. 3, fig. 34.

Cancellated by distant, narrow, prominent ribs, occasionally varicose, and thread-like spiral ridges; whitish, with two chest-

nut bands on the body-whorl, one of which is frequently partly visible on the spire. Length, 1–1·5 inches.

Mediterranean Sea; W. Coast of Africa.

Weinkauff (Jour. de Conch., iii ser., iv, 13), gives some interesting particulars of the habits and appearance of this animal. He says that it lives upon a sandy bottom, almost completely deprived of marine plants, although Deshayes supposed it to be phytophagous; it was mostly obtained at a depth of 25 to 30 feet, although some were found in shallower water. The animal can develop itself until the head and neck are as long as the shell, and the foot longer. Its movements are slow. A quantity of fine sand adheres to the foot, so that when the animal retires into its shell the aperture appears as though filled with sand, The exterior of the shell is also covered with fine sand, requiring a brush to remove it, and indicating possibly a burrowing habit.

C. SIMILIS, Sowb. Pl. 3, fig. 35.

Very narrowly umbilicated; strongly, narrowly, distantly ridged, cancellated by spiral closer ridges; occasionally varicose; whitish, tinged with chestnut, usually imperfectly narrowly two-banded with chestnut. Length, 1–1·25 inches.

Senegal.

A thicker, more globose and smaller species than the preceding, of which it is made a synonym by Weinkauff (Conch. Mittelm., ii, 171).

C. PULCHRA, Sowb. Pl. 3, fig. 36.

Umbilicus wide; shell slightly shouldered and coronated, spinosely cancellated; whitish, banded and lineated with chestnut. Length, 1·25 inches.

St. Elena, W. Columbia (sandy, 8–10 fms.), Cuming.

C. CHRYSOSTOMA, Sowb. Pl. 3, figs. 38, 37, 39.

Whorls but slightly angled above, rudely decussated by thick ribs and revolving ridges; whitish, sparingly dotted and lineated with chestnut; the umbilical ridge bears a single series of chestnut spots, and the narrow shoulder is sometimes chestnut-tinged; columella, and sometimes the margin of the outer lip, orange-color. Length, 1–1·25 inches.

Panama and St. Elena, Cent. America.

Var. HÆMASTOMA, Sowb. Figs. 37, 39.

Rudely angled above, with regular distant thick rounded ribs, decussated by spiral ridges; yellowish white, blotched and banded with chestnut; columella and margin of aperture orange-red. Length, 1–1·25 inches.

Galapagos Is. (sandy, 10–16 fms.), Cuming.

The ribs are smaller and more distant than in the typical shell. Some specimens are entirely white.

C. RUGOSA, Lam. Pl. 3, fig. 40.

Solid, imperforate, whorls obtusely angled above; distantly ribbed, and spirally ridged; pale straw-color or whitish, tinged with light chestnut, especially on the shoulder, and sometimes chestnut-banded; columella spreading, white.

Length, ·75–1 inch.

West Indies.

The locality "China," given by Reeve and others, is erroneous.

C. UNALASHKENSIS, Dall. Pl. 3, fig. 41.

Whorls 6, somewhat turreted, with strong revolving ridges, decussated on the spire, and upper portion of the body-whorl by longitudinal riblets, the intersections of the riblets and ridges nodulous; white, with traces of a nut-brown epidermis.

Length, ·75 inch.

Unalashka, Aleutian Is. (30–60 fms., stony mud).

C. CIRCUMCINCTA, Dall. Pl. 3, fig. 42.

Whorls 6, thin and delicate, slightly shouldered, crossed by very faint irregular longitudinal riblets, most evident on the apical whorls, and evanescent on the body-whorl, sculptured with strong revolving ridges, slightly granulated on the upper whorls; outer lip thin and delicate, the sculpture of the exterior showing through; columella with two or three very faint plicæ; rose-pink, strongest on the ridges. Length, ·82 inch.

Popoff Strait, Shumagin Islands (10 fms., stony mud).

Perhaps would be better referred to the S. G. Admete.

C. TURRITA, Sowb. Pl. 3, fig. 43.

Slightly shouldered; columella with three small folds; flesh-color. Length, 28 mill.

Habitat unknown.

C. PARVA, Philippi. Pl. 3, fig. 44.

Subimperforate, columella biplicate, outer lip plicate within; white (bleached). Length, 11 mill.

Coast of Atacama, Chili.

C. MINIMA, Reeve. Pl. 3, fig. 45.

Obliquely ribbed, ribs obtusely noduled at the upper part, interstices neatly cancellated, columella obsoletely two-plaited; white, sometimes brownish. Length, 4·5 mill.

Hab. unknown.

C. PUSILLA, H. Adams. Pl. 3, fig. 46.

Whorls 5, whitish; longitudinally obtusely nodulosely plicate, with remote spiral threads; aperture scarcely canaliculate below; outer lip lirate within, columella with two plicæ.

Length, 6 mill.

Canary Islands.

I have not seen the species; the figure scarcely represents a typical Cancellaria.

C. JAPONICA, E. A. Smith. Pl. 3, fig. 47.

White, thickish; whorls 7, divided by a deep suture, longitudinally 13-ribbed and spirally lirate, 6 or 7 liræ on the penultimate and 12 on the last whorl; columella with two small plaits.

Length, 12 mill.

Japan.

Subsection EUCLIA, H. and A. Adams.

C. SOLIDA, Sowb. Pl. 3, figs. 48, 49.

Imperforate, solid, smooth, earlier whorls decussately ridged, body-whorl broadly shallow-grooved below; columella with two somewhat prominent plaits; orange-fawn color, interior white.

Length, 1·25–1·5 inches.

Panama, Real Llejos, Central America.

It is *C. obtusa* of Kiener, not Lamarck. *C. bulbulus*, Sowb. (fig. 49), appears to me to be a not fully developed large specimen.

C. PYRUM, Adams and Reeve. Pl. 3, fig. 50.

Solid, imperforate, spire very short, slightly immersed, strongly cancellated, last whorl smooth, striated at the base; columella broadly callous above, granosely wrinkled at the base, plaits three,

the uppermost sharp and prominent; fulvous brown, lighter within the aperture. Length, 1·5 inches.

China Sea.

I have not seen this species, but the figure is too close to *C. bulbulus.*

C. LACTEA, Desh. Pl. 3, fig. 51.

White, smooth, thin, translucent, columella three-plaited; cream-colored. Length, 22 mill.

Hab. unknown.

C. LÆVIGATA, Sowb. Pl. 3, fig. 52.

Rather solid, whorls narrowly obtusely angled at the upper part, obsoletely plicate on the spire and angle, otherwise smooth; whitish, obscurely tinged with flesh-brown, blotched with chestnut on the shoulder; plaits three, prominent.

Length, 1–1·25 inches. *New South Wales.*

Possibly identical with the preceding species.

Subsection MERICA, H. and A. Adams.

C. ASPERELLA, Lam. Pl. 4, figs. 53, 50–52, 54; Pl. 3, fig. 53.

Thick, imperforate, everywhere granosely reticulated, very narrowly angulated at the suture; whitish, banded with orange-brown or entirely brown or chocolate-colored; columella three-plaited. Length, 1·25–1·75 inches.

China, Japan, Philippines.

A variety of this species was first described by Sowerby as *C. elegans* (fig. 53), a name preoccupied by Deshayes for a fossil species of the Paris basin, and therefore changed by Crosse to *C. Reeveana;* however, *C. Sinensis*, Reeve (fig. 50), representing a not fully developed shell, has priority over the latter name. Kobelt has described vars. *subsinensis* (fig. 51), with less impressed suture, and *laticosta* (fig. 52), with more distant ribs and umbilical region more strongly defined. Another variety, connecting the form *Sinensis* with the type is *C. melanostoma*, Sowb. (fig. 54).

C. BIFASCIATA, Desh. Pl. 4, fig. 55.

Whorls very narrowly shouldered, densely decussated; orange-brown, with two whitish bands. Length, 1·25–1·5 inches.

Straits of Macassar.

C. PURPURIFORMIS, Val. Pl. 4, fig. 56.

Longitudinally obsoletely plicate, spirally linearly grooved; brownish white. Length, ·75 inch.

Hab. unknown.

C. CORRUGATA, Hinds. Pl. 4, fig. 57.

Oblong pear-shaped, imperforate, longitudinally obsoletely wrinkled, decussated with spiral impressed lines; aperture ridged within, columella two-plaited; fulvous olive.

Length, 22 mill.

Bay of Guayaquil.

This is the type of the S. G. Massyla, H. and A. Adams, but it may as well go in this group, the distinctive characters being of little value.

C. TESSELLATA, Sowb. Pl. 4, figs. 58–60.

Whorls granosely decussated; whitish, banded and sometimes tessellated with chestnut. Length, 1 inch.

West Coast of Central America, 7–10 fms., sandy mud (Cuming); *La Paz*, *Gulf of California* (Stearns).

The type of S. G. Aphera, H. and A. Adams, but having no good characters by which to separate it from the present group.

Subsection NARONA, H. and A. Adams.

C. CLAVATULA, Sowb. Pl. 4, fig. 61.

Obtusely longitudinally ribbed, here and there irregularly varicose, spirally striated; columella two-plaited; chestnut-color, narrowly white-banded at the shoulder angle and on the middle of the body-whorl. Length, 25–35 mill.

Panama.

C. UNIPLICATA, Sowb. Pl. 4, figs. 62, 63.

Spire turreted, whorls concavely shouldered, closely decussated by nodulous ridges, the spiral ones forming a serrated outer lip; columella one- or obscurely two-plaited; chestnut or chocolate-color, interior purplish chocolate.

Length, 1·25–1·75 inches.

Panama.

C. Mitræformis, Sowb. (fig. 62), is identical; Mr. Crosse changed its name to *C. Sowerbyi*, because the former name is preoccupied by Brocchi for a fossil species.

C. TÆNIATA, Sowb. Pl. 4, fig. 64.

Turreted, whorls narrowly, flatly shouldered, longitudinally narrowly ribbed, faintly spirally ridged; columella two-plaited; reddish brown, with darker spiral lines. Length, 15–20 mill.

Hab. unknown.

Scarcely a member of the group.

C. ELATA, Hinds. Pl. 4, fig. 65.

Strongly ribbed, spirally ridged; columella three-plaited; brownish yellow. Length, 16 mill.

Panama (30 fms.), Hinds.

C. COOPERI, Gabb. Pl. 4, fig. 66.

Shell turreted, with shouldered whorls, the angle of the shoulder slightly coronated by the terminations of narrow, distant longitudinal ribs, the interstices closely spirally striate; columellar plications small; yellowish brown, darker on the shoulder, with rather regular narrow spiral chestnut lines.

Length, 2·5 to nearly 4 inches.

Monterey and San Diego, Cal.

The largest species of the genus. It is perhaps identical with *C. tæniata*, Sowb.; that is, supposing the latter to be a young specimen. I owe to R. E. C. Stearns, Esq., the opportunity of figuring the type. He has also sent me a drawing of a very large specimen in the Hermann Collection, San Francisco.

C. MACROSPIRA, Ads. and Reeve. Pl. 4, fig. 67.

Occasionally varicose, decussately finely ridged, suture excavated; whitish, semipellucid. Length, 1 inch.

Borneo; China Sea.

C. CORONATA, Scacchi. Pl. 4, fig. 68.

Turreted, excavated below the suture, longitudinally distantly costate, ribs projecting at the shoulder angle, spirally striate.

Length, ·75 inch.

Mediterranean Sea.

Described as a fossil species, but recently recorded by Dr. J. Gwyn Jeffreys as living in the Mediterranean. *C. varicosa*, Phil., is a synonym.

C. ANGASI, Crosse. Pl. 4, fig. 69.

Imperforate, thin, subscalariform, flat-shouldered, with a carina at the angle, another carina below the middle of the body-whorl,

narrowly distantly longitudinally ribbed, spirally striate; lip not lirate within, columella biplicate; whitish. Length, 15 mill.

Habitat unknown.

Section TRIGONOSTOMA, Blainville.

C. PISCATORIA, Gmelin. Pl. 4, fig. 70.

Coarsely reticulated by longitudinal and spiral ridges and prickly at the interstices, shoulder smooth; white tinged with light chestnut or brown, and usually showing a central white band; interior of aperture orange-brown, with the white band. Length, 1–1·25 inches.

West Coast of Africa.

A peculiarity of this species is the single plait situated about the middle of the inner lip. It is *C. nodulosa*, Lam.

C. SPIRATA, Lam. Pl. 4, fig. 71; Pl. 5, fig. 72.

Whorls deeply excavated around the suture, smooth, longitudinally ribbed near the apex, superficially spirally grooved on the body-whorl; aperture closely ridged within, columella with three plaits; light yellowish brown or yellowish white with a band or orange-brown spots encircling the shoulder angle. Length, 1 inch.

So. Australia, Tasmania.

C. excavata, Sowb. (fig. 72), is a light-colored variety. The species has much the form of a miniature *Eburna Australis.*

C. FOVEOLATA, Sowb. Pl. 5, figs. 73, 74.

Turriculated, whorls slantingly excavated at the sutures, forming a sharp keel, smooth, or distantly obsoletely longitudinally ribbed; flesh-brown, blotched with orange-brown about the keel, sometimes with an interrupted light central chestnut band; sometimes lineated with chestnut. Length, 12–20 mill.

Cape of Good Hope.

C. SEMIDISJUNCTA, Sowb. Pl. 5, fig. 75.

Broadly umbilicated, the excavation defined by a sharp angle, whorls broadly excavately angled at the suture; spirally ridged and grooved, the ridges and grooves divided by striæ, obsoletely distantly longitudinally ribbed; columella two-plaited; yellowish

white, tinged with light chestnut, especially upon the ribs—which thus become more apparent. Length, ·75–1 inch.

Cagayan, Isl. of Mindanao, Philippines, sandy mud, 25 fms. (Cuming).

C. TUBERCULOSA, Sowb. Pl. 5, figs. 76–78.

Deeply umbilicated, concavely shouldered around the suture, which is coronated with blunt tubercles at the angle, below it are two or three somewhat equidistant spiral rows of tubercles, with spiral striæ in the interspaces; columella obliquely produced below, with two small plaits; yellowish white, tubercles often tinged with chestnut, forming somewhat interrupted narrow bands. Length, 1·25–1·5 inches.

Iquiqui, Peru, 7 fms. (Cuming); *Gulf of Nicoya, Central America*, 12 fms. (Cuming).

The latter locality is that of *C. bullata*, Sowb. (fig. 78), which is certainly a synonym.

C. TRIGONOSTOMA, Lam. Pl. 5, fig. 79.

Scalariform, the angles of the shoulder and of the wide umbilical excavation both spinose, obsoletely longitudinally ribbed, spirally ridged; flesh-color, sometimes lineated with chestnut. Length, 35 mill.

? Ceylon; ? Moluccas.

A very rare shell, first described by Lamarck as a Delphinula.

C. GONIOSTOMA, Sowerby. Pl. 5, figs. 80–85.

Excavately shouldered, widely umbilicated, distantly strongly ribbed, the ribs crossing the shoulder to the suture, rather coarsely spirally ridged, the intersections often bluntly nodose; aperture ridged within, columella two- or obscurely three-plaited; yellow, yellowish brown, or light chocolate-color, interruptedly lineated spirally with chestnut. Length, 1–1·4 inches.

West Coast of Central America, northward to Mazatlan.

The following are synonyms: *C. brevis*, Sowb. (fig. 82), a small, worn specimen; *C. costata*, Gray = *C. rigida*, Sowb. (figs. 83–85), said to come from the mouth of the Gambia, by Sowerby, but referred by Reeve, on the authority of Cuming, to Puerto Portrero, Central America.

C. BICOLOR, Hinds. Pl. 5, fig. 86; Pl. 6, figs. 89, 90.

Shouldered, longitudinally distantly costate, crossed at regular distances by slightly elevated lines; aperture ridged within, columella triplicate; umbilicus large; yellowish white, banded or clouded or nearly covered with chestnut or chocolate.

Straits of Macassar (Hinds); *Philippines* (Cuming).

Hinds' figure (fig. 86) represents a shell only half an inch long, yet in his description he states that the species is larger than *C. rigida*, Sowb. The figures given by Reeve and Sowerby are much larger than that of Hinds, and may not represent the same species. Hinds' figure much resembles C. *costifera*, Sowb.; the others are nearly related to *C. goniostoma*, Sowb.

C. STIMPSONII, Calkins. Pl. 5, fig. 87.

Whorls shouldered, the angle nodulous, surface below it covered with irregular nodules, which do not appear to be developed in the lines of longitudinal ribs, but rather from revolving sculpture; columella with two plaits, whitish.

Length, 17 mill.

Cape Sable, Florida (Calkins).

C. ANTIQUATA, Hinds. Pl. 5, fig. 88.

Broadly excavated below the suture, widely and deeply umbilicated, keeled and spinose at the shoulder and umbilicus; the spines being the terminations of sharply plicate ribs; otherwise smooth; columella rather obsoletely biplicate; blush or yellowish white. Length, ·75 inch.

New Guinea, 22 fms., coarse sand (Hinds).

S. SCALARINA, Lam. Pl. 6, fig. 91.

Umbilicated, distantly ribbed, spirally finely striate; yellowish white, more or less clouded with light chestnut, with frequently a central white band. Length, 1–1·25 inches.

Isle of France.

Sowerby and Reeve have figured the next species for this.

C. THOMASIANA, Crosse. Pl. 6, figs. 92–94.

Scarcely umbilicated, turreted, whorls excavated at the suture, border sharply spinosely keeled, obliquely, narrowly, distantly

ribbed; columellar plaits three, small; fulvous fawn-color, with a central white band. Length, 28 mill.

? West Indies; China; Japan.

This is the *C. scalarina* of Sowerby and Reeve; its West Indian locality is very doubtful, and I think it not unlikely that it will prove to be a variety of *C. scalarina* after all. *C. Mangelioides*, Reeve (fig. 94), is a depauperate shell which may well be referred here; if identical, its name will have precedence. Another synonym is *C. Bocageana*, Crosse and Debeaux (fig. 92), a Chinese species, which Lischke considers identical.

C. SCALARIFORMIS, Lam. Pl. 6, fig. 95.

Narrowly umbilicated, flat shouldered, distantly narrowly ribbed, the ribs crossing the shoulder, closely spirally striate; columella two-plaited; chestnut ash-color. Length, 1 inch.

East Indies.

This species is omitted from the monographs of Sowerby and Reeve. Kiener thinks that Sowerby's *C. costifera* and *C. articularis* are varieties of it; to these might be added several others, if the species were well determined—which I am afraid it is not.

C. CRISPATA, Sowb. Pl. 6, fig. 96.

Imperforate, whorls narrowly angled above, obliquely longitudinally thick-ribbed, ribs projecting at the shoulder angle, decussated with spiral striæ; whitish, with chestnut-brown bands and lines. Length, 1 inch.

Philippines (Cuming); *Red Sea* (Tapparone-Canefri).

Allied to the next species, from which it is chiefly distinguished by its very thick ribs and want of umbilicus.

C. CRENIFERA, Sowb. Pl. 6, figs. 97–99.

Deeply umbilicated, whorls flatly excavated at the suture, obliquely ribbed, the ribs spinosely hooked above the shoulder angle, spirally crenately ridged; columella three-plaited, aperture ridged within; livid fawn-color or yellowish white, often white-banded in the middle. Length, 1 inch.

Philippines; Indian Archipelago.

This and several other allied species are probably only varieties of *C. scalarina*, Lam. *C. lamellosa*, Hinds (fig. 98)

and *C. serrata*, Reeve (fig. 99), are synonyms. The latter name being preoccupied by Bronn for a fossil species, Semper changed it to *C. Crossei.*

C. HYSTRIX, Reeve. Pl. 6, fig. 100.

Imperforate, globosely ovate, whorls narrowly shouldered, obliquely, longitudinally, closely ribbed, ribs erect, narrow, prickly serrated by spiral lines, shoulder angle spiny; whitish, faintly tinged with livid brown; columellar plaits three; irregular, interior of aperture red-lined. Length, 1 inch.

Mauritius.

C. OBLIQUATA, Lam. Pl. 6, fig. 1.

Globosely ovate, ventricose, narrowly deeply umbilicated; whorls excavately shouldered, obliquely thinly ribbed, the ribs slightly prickly at the shoulder angle, spirally elevately striated, the intersections slightly nodulous; yellowish white, stained and spotted with chestnut. Length, 1 inch.

Philippines, Zanzibar.

This shell probably passes into *C. scalata*, Sowb., a form with more exserted spire; Sowerby's figure 82, intended for *C. obliquata*, represents one of these transition forms.

C. SCALATA, Sowb. Pl. 6, figs. 3–9; Pl. 7, fig. 11.

Narrowly umbilicated, excavately shouldered, nodulous throughout by the intersection of longitudinal close ribs and spiral elevated lines; yellowish white to chestnut-color.

Length, 1–1·25 inches.

Red Sea, Ceylon, Mauritius, Moluccas, New Caledonia.

Differs (not sufficiently) in form principally, from the preceding species, the body-whorl being less ventricose and the spire longer. *C. textilis*, Kiener (fig. 3), *C. articularis*, Sowb. (fig. 4), *C. contabulata*, Sowb. (fig. 5), *C. pusilla*, Sowb. = young *C. contabulata* (fig. 6), *C. Forestieri*, Montr. (fig. 7), and *C. Rougeyroni*, Souv. (fig. 11), from New Caledonia, are synonyms. *C. Montrouzieri*, Souverb. (fig. 8), is mainly distinguished from the last named, by the shoulder being biplanate and carinate at the angle; I believe it to be a merely accidental variety; it is also New Caledonian. *C. tenuis*, A. Adams (fig. 9), appears to be founded on a not fully grown individual of the normal form.

C. Wilmeri, Sowb. Pl. 7, fig. 10.

Turriculated, the shoulder narrowly excavated, nodosely closely cancellated; columella triplicate; dark chestnut-color, faintly banded with white on the middle of the body-whorl.

Length, 11 mill.

Andaman Islands.

Has a longer spire than the preceding species.

C. costifera, Sowerby. Pl. 7, figs. 12, 13.

Umbilicus narrow, whorls somewhat flatly shouldered, the angle bluntly spinose; ribs elevated, compressed; distant revolving sculpture faint or obsolete; columella triplicate; yellowish brown to chocolate-colored, with narrow red revolving lines.

Length, ·5–1 inch.

Philippines, New Caledonia.

The painting and wide spaces between the ribs, and want of prominent spiral sculpture are the distinctive features of this species. *C. Souverbiei*, Crosse (fig. 13), is a synonym; it comes from New Caledonia.

C. Lamberti, Souverbie. Pl. 7, fig. 14.

Umbilicus moderate, ribs distant, spirally subcostulate; dirty white. Length, 13 mill.

New Caledonia.

The umbilicus and spiral sculpture are more developed than in *C. costifera*, to which the species is very closely allied. The specimens before me, as well as those from which the original description was made, are not in a fresh state.

C. nitida, A. Adams. Pl. 7, fig. 16.

Superficially umbilicated, narrowly angled at the suture, ribs compressed and very prominent, sharp, with the interstices smooth; fleshy white. Length, 9 mill.

Philippines.

C. Verreauxii, Kiener. Pl. 7, fig. 15, 17.

Narrowly, deeply umbilicated, obtusely angled near the suture, rudely nodosely ribbed, and spirally ridged; orange-brown.

Length, 11 mill.

Habitat unknown.

C. coctilis, Reeve (fig. 17) appears to be the same species, not fully grown.

C. Littorinæformis, Sowb. Pl. 17, fig. 18.

Rather thin, deeply umbilicated, whorls narrowly angled above, thinly decussately striated throughout. Length, 1 inch.

Ceylon.

C. semipellucida, Ads. and Reeve. Pl. 7, figs. 19, 20.

Ovately ventricose, rather thin, minutely umbilicated, suture deeply impressed, whorls somewhat round-shouldered, longitudinally obliquely plicate, spirally finely ridged; aperture ovate, attenuated at the base, smooth within, columella three-plaited; fulvous, subpellucid. Length, 12–15 mill.

Sooloo Sea.

The plications are sometimes more or less obsolete on the back; it appears to form a passage to Admete.

C. funiculata, Hinds. Pl. 7, figs. 21, 22.

Umbilicated, excavated at the suture, round-shouldered; ribs compressed, distant, crossed by delicate spiral ridges and alternate raised lines; transparent white, tinged with orange-brown. Length, ·75 inch.

? Magdalena Bay, L. California;
sandy mud, 7 fms. (Hinds).

A single specimen is reported to have been obtained at the above locality, which, as well as the following, may be erroneous. *C. lyrata*, Ads. and Reeve (fig. 22), to which Mr. Arthur Adams assigns the locality, China Sea, is evidently the same species.

Unfigured and Unidentified Species of Cancellaria.

C. Tasmanica, Tenison-Woods.	*Tasmania.*
C. Trailli, Hutton.	*New Zealand.*
C. Mitroides, Fischer (Mus. Demidoff).	*Hab. unknown.*
C. multiplicata, Lesson.	*Hab. unknown.*
C. nassa, Roissy.	*Hab. unknown.*
C. asperula, Desh.	*Hab. unknown.*
C. decussata, Nyst.	*Hab. unknown.*

This species is probably poorly figured; it has been overlooked by previous monographers. Possibly it equals *C. bifasciata*, Desh.

C. PYGMÆA, C. B. Adams. *Panama.*
C. CANDEI, d'Orb.= *Phos Guadeloupensis*, Petit (Manual, iii, 219).
C. TENERA, Phil *Hab. unknown.*
C. MODESTA, Carpenter. *Vancouver's Island.*
C. IMBRICATA, Watson. *Off Cape of Good Hope.*
C. FISCHERI, A. Adams. *Strait of Corea.*
C. CRENULATA, A. Adams. *China Sea.*

Subgenus ADMETE, Kroyer.

C. VIRIDULA, Fabr. Pl. 7, figs. 23–28.

Very thin, whitish, yellowish or greenish white, or very light brown, suture rather deeply impressed, whorls rounded, wrinkled costate above, encircled throughout with equidistant raised lines; columella obliquely truncate and minutely triplicate, outer lip smooth within.

Length, 12–15 mill. (var. *grandis*, 15–30 mill).

Massachusetts Bay, Maine, Gulf of St. Lawrence, Labrador, Iceland, Arctic Norway, White Sea, Spitzbergen, Behring's Strait, N. Japan.

A circumpolar species, inhabiting from shore to 690 fathoms (dredged). It is extinct in the British seas.

Jeffreys thus describes the animal:—

"Body milk-white; head furnished with a long and prominent veil; tentacles contractile, thread-shaped, rather long and slender, smooth, with blunt tips, diverging at an angle of 45°; eyes placed on the top of short stalks, at the outer base of the tentacles, with which the eye stalks are united; foot large, triangular and long, squarish and double-edged in front, and bluntly pointed behind, edges uneven; pallial fold (lining the basal groove of the shell) very short and thick. No operculum. Active; crawls out of the water. It emits a greenish liquid on being touched with a camel's-hair brush."

It is *C. subangulosa* of Wood's "Crag Mollusca;" *C. crispa*. Möller; *C. Buccinoides*, Couthouy (= *C. Couthouyi*, Jay); *C. costellifera*, Sowb.

Like many other circumboreal species, the shell varies con-

siderably in its characters; two forms of it have been described as varieties by Leche.

Var. UNDATA, Leche (fig. 27).
Var. LÆVIOR, Leche (fig. 28 = var. *grandis*, Mörch).
Var. ELONGATA, Leche (fig. 25).
Var. DISTINCTA, Leche (fig. 26).

C. ARCTICA, Middendorff. Pl. 7, fig. 29.

Whorls encircled by rounded ribs, the interstices with close zigzag longitudinal striæ. Length, 30 mill.

Behring's Strait.

C. TABULATA, Sowb. Pl. 7, fig. 30.

Whorls narrowly tabulate, granular from decussating ribs; white, under a brownish epidermis; columella minutely plicate. Length, 22 mill.

Arctic Ocean.

C. LIMNÆIFORMIS, E. A. Smith. Pl. 7, fig. 31.

Smooth, thin, diaphanous, whorls 3. Length, 2·5 mill.

Kerguelen Island.

Mr. Smith writes of this species that it has the appearance of a minute Limnæa with the columella truncated a little below the middle. "Although this is a very curious form for an Admete, I am not acquainted with any other genus which it more resembles. The character of the truncation of the columella is similar, and the absence of an operculum is also congeneric. From the fewness of the whorls and the thinness of the shell it may be conjectured to be but the young of some larger species. This may be the case, but at present I am unable to identify it as the fry of any genus with which I am acquainted."

Unfigured Species.

C. BOREALIS, A. Adams.	*Melville Island.*
C. AUSTRALIS and C. SCHYTHEI, Philippi.	*St. of Magellan.*
C. COSTATA, Calcara.	*Sicily.*
C. OVATA and GLOBULARIS, E. A. Smith.	*Japan.*
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Family *STROMBIDÆ.*

Shell imperforate, usually solid, with turriculated spire, and more or less dilated or winged lip; the lip frequently digitated, with usually a sinus near the base for the protrusion of the head of the animal; aperture mostly canaliculated at each extremity, the columella callous, without plaits. Operculum corneous, small, generally unguiculate, sometimes oval, with apical nucleus.

Animal with sessile or pedunculated eyes, slender tentacles, contractile annulated proboscis, short siphon, varying foot. Dentition tænioglossate.

Corresponds with the family Alata of Lamarck.

Subfamilies.

Subfamily Strombinæ. Animal furnished with large eyes, placed on thick cylindrical peduncles; the iris highly colored, often in concentric zones, tentacles slender, rising from the middle of the eye-peduncles; foot narrow, adapted for leaping rather than walking; siphon very short, not extending beyond the anterior canal of the shell; mantle with an extension laying in the posterior canal; penis long, narrow, with a hook-like or bifurcated extremity. Dentition. Central tooth multicuspid, short; laterals, one on each side, subtrigonal, with crenulated margins; marginals falciform, narrow, sharp-pointed, with finely denticulated margin (Pl. 1, fig. 1).

Shell with expanded, entire, or shortly digitated lip, with an anterior marginal sinus, and usually a posterior prolongation; aperture canaliculated anteriorly and posteriorly. Operculum narrow, unguiculate.

Subfamily Aporrhainæ. Eyes small, sessile at the outer bases of the narrow, subulated tentacles; foot rather small, oblong, adapted for walking. Operculum suboval. Dentition: central tooth subquadrangular, the edge multicuspid; laterals transverse, with entire margins; marginals elongated, narrow, curved, sharp, with entire margins (Pl. 11, fig. 25).

Shell with turriculated spire, the lip much dilated, usually digitated, with an incomplete canal or notch in front.

Differs from Strombinæ in the form and adaptation of the foot and in the dentition; the shell differs in the absence (in most of the genera) of a labial sinus, but is closely related with the Pterocera of the Strombinæ, and a little remotely with the Cerithiidæ.

Subfamily STRUTHIOLARIINÆ. Tentacles slender, rather short, with the eyes on short pedicels at their external bases; foot oval, adapted for swimming; proboscis long; siphon scarcely perceptible. Operculum shortly unguiculate. Dentition: 5·1·1·1·5; central tooth subquadrangular, with multicuspid edge, the laterals oblong, multicuspid; marginals falciform. sharp, narrow, with crenulated margins (Pl. 12, fig. 42).

Shell buccciniform, the aperture angular, shortly subcanaliculated below; lip thickened, sinuous, entire; columella thickened, polished, subtruncate below.

Synopsis of Genera.

The Strombidæ abound in fossil forms, some of them of very bizarre appearance; as these are all described and illustrated in the "Structural and Systematic Conchology," they will be simply named here, with references to that work.

Subfamily Strombinæ.

Genus STROMBUS, Linn., 1758.

Shell ovate, turreted or subfusiform, often tuberculated or spinose, imperforate, covered by a thin, horny epidermis, solid; aperture long, narrow, emarginate or with a short canal in front, canaliculated or channeled posteriorly; outer lip usually dilated, thickened, often lobed, with a sinus near the front; columellar lip simple, callous. Operculum narrowly unguiculate, the margins denticulated, or rugose. In the young, the lip of the shell is not expanded, so that it appears something like a Conus.

Section I. STROMBUS (*sensu stricto*). Lip with entire margin, widely expanded, not prolonged upon the spire behind; inner lip not restricted or defined. *S. gigas*, Linn.

Section II. EUPROTOMUS, Gill, *em.*, 1869. Lip widely expanded, ascending the spire, the outer margin folded in and thickened, the posterior margin subdigitate or plain. *S. laciniatus*, Chemn.

Section III. Monodactylus, Klein, 1753. Lip with a posterior, narrow, much produced lobe. *S. Pacificus*, Swainson.

Section IV. Gallinula, Klein, 1753. Lip somewhat dilated, not digitate, frequently descending the spire behind; inner lip restricted, defined. *S. succinctus*, Linn.

Section V. Canarium, Schum., 1817. Lip not dilated, posterior canal short or obsolete. *S. urceus*, Linn.

Section VI. Conomurex, Bayle, 1884. Shell cone-shaped, with short spire, aperture narrow, with subparallel lips, the outer lip not dilated. *S. Luhuanus*, Linn.

Section VII. Oncoma. Mayer, 1876. Fossil, Eocene of Europe. S. and S. Conch., ii, 190.

Subgenus Pugnellus, Conrad, 1860.

Fossil only, Cretaceous U. S. S. and S. Conchology, ii, 190, t. 60, f. 71, 72.

Section Gymnarus, Gabb, 1868. Fossil. S. and S. Conch., ii, 190, t. 60, f. 73.

Subgenus Pereiræa, Crosse, 1867.

Fossil only. Miocene of Spain and Portugal. S. and S. Conch., ii, 194, t. 60, f. 87.

Genus PTEROCERA, Lamarck, 1799.

Outer edge of the mantle digitated. Operculum as in Strombus. Shell ovate, spire turriculated, aperture narrow, elongated, outer lip much expanded, tubularly digitate, with a sinus near the base, a long, straight or curved anterior canal, and a posterior canal ascending and sometimes surpassing the spire.

The young shell, like Strombus, is coniform, with the outer lip straight and simple; the claws or digitations being gradually formed with the growth of the shell. At first they are short, open canals, and afterwards close and become solid.

Section I. Pterocera (*sensu stricto*). Anterior canal straight or curved to the right, posterior canal ascending the spire.

Subsection I. (*Heptadactylus*, Klein). Lips smooth, digitations not numerous. *P. lambis*, Linn.

Subsection II. (*Millipes*, Klein). Lips rugose or corrugated, digitations more numerous. *P. scorpio*, Linn.

Section II. HARPAGO, Klein, 1753. Anterior and posterior canals both curved to the left, the latter at first crossing the shell transversely. *P. rugosa*, Sowb.

Subgenus PHYLLOCHEILUS, Gabb, 1868.

(Melaptera, Piette, 1876). Fossil only. S. and S. Conch., ii, 191, t. 60, f. 74.

Subgenus HARPAGODES, Gill, 1869.

Jurassic and Cretaceous. S. and S. Conch., ii, 195, t. 60, f. 93.

Genus ROSTELLARIA, Lamarck, 1799.

Animal similar to Strombus. Operculum not serrated on the edge. Shell fusiform with elevated spire, whorls numerous, smooth, or slightly ribbed; aperture continued into a narrow, usually long, straight or slightly curved anterior canal, and a shorter posterior canal ascending the spire, outer lip thickened, not much expanded, shortly digitated in the typical group. The (restricted) Rostellarias belong to the present epoch or extend at most only into the more recent tertiaries; but a number of fossil groups are usually considered as belonging to the genus. *R. curta*, Sowb.

? Section MITRÆFUSUS, Bellardi, 1871. Miocene. Structural and Syst. Conch., ii, 128, t. 47, f. 80. This has been considered a member of the family Fusidæ, but Dr. Fischer calls attention to its close resemblance to a young Rostellaria.

Subgenus RIMELLA, Agassiz, 1840.

Shell cancellated, anterior canal short, posterior canal rather long, applied to the spire; lip but little dilated, usually rugose, and having an exterior rib, not digitated. *R. crispata*, Sowb.

The few recent species belong to the Philippine Island fauna; there are also Cretaceous and Tertiary species.

? Section ISOPLEURA, Meek, 1864. A cretaceous group, having no posterior canal, and perhaps not belonging to this family. S. and S. Conchology, ii, 192, t. 60, f. 76.

? Section STROMBOLARIA, Gregorio, 1880. An eocene fossil which seems to possess the essential characters of Isopleura; it

is ribbed longitudinally, occasionally varicose, and without posterior canal. *R. crucis*, Bayan.

Section CYCLOMOLOPS, Gabb, 1868. Eocene. S. and S. Conch., ii, 192, t. 60, f. 77.

Subgenus HIPPOCHRENES, Montfort, 1810.

Eocene of Europe and America. S. and S. Conch., ii, 191, t. 60, f. 75.

Section ORTHAULAX, Gabb, 1873. Tertiary. S. and S. Conch., ii, 192.

Section LEIORHINUS, Gabb, 1860. Eocene, Ala. S. and S. Conch., ii, 191, t. 60, f. 92.

Section CALYPTROPHORUS, Conrad, 1857. Eocene, U. S.; Cretaceous, India. S. and S. Conch., ii, 192, t. 60, f. 78.

Subgenus PTERODONTA, d'Orbigny, 1851.

Cretaceous. S. and S. Conchology, ii, 190, t. 88, f. 56.

Genus TEREBELLUM, Klein, 1753.

Anterior part of foot very small, posterior part oval, compressed; eyes on the ends of peduncles; no tentacles; siphon rudimentary; mantle with a posterior filiform appendage, laying in the sutural canal. Operculum small, narrow, digitated.

Shell elongate, subcylindrical, spire rather short, apex obtuse; aperture narrow, broadly notched in front; lip simple, columella truncated.

Section I. TEREBELLUM (*sensu stricto*). Shell smooth, spire rather short, with channeled suture. *T. subulatum*, Linn.

Section II. TEREBELLOPSIS, Leymerie, 1844. Nummulitic. S. and S. Conch., ii, 193, t. 60, f. 81.

Section III. SERAPHS, Montfort, 1810. Spire concealed under a callous covering. Eocene. *T. convolutum*, Lam.

Section IV. MAURYNA, Gregorio, 1880. Surface longitudinally folded. Nummulitic. *T. plicatum*, d'Arch.

Subfamily Aporrhainæ.

Genus APORRHAIS, Dillwyn, 1823.

Shell fusiform, spire turreted, with a short canal in front, and a posterior canal running up the spire; outer lip of adult expanded,

thickened, and 2–3 digitated, the digitations continued as carinæ on the back of the shell. *A. pes-pelecani*, Lam. 4 recent species, N. Atlantic Ocean; fossil, Jurassic—.

Section I. APORRHAIS (*sensu stricto*). Lip bi- or tri-digitate, posterior digitation canaliform, running up the spire, the extremity free.

Section II. ARRHOGES, Gabb, 1868. Shell with expanded, simple lip, with a posterior, obtuse, lobe-like extension, the anterior sinus nearly obsolete: anterior canal short and obtuse; posterior canal very short. *A. occidentalis*, Beck.

Section III. GONIOCHILA, Gabb, 1868 (Alipes, Conrad, 1865, without description). Eocene. S. and S. Conch., ii, 193, t. 60, f. 82.

Section IV. CERATOSIPHON, Gill, 1870. Cretaceous. S. and S. Conch., ii, 196, t. 60, f. 94.

Section V. CYPHOSOLENUS, Piette. 1876. Jurassic. L. c., ii, 193.

Section VI. TESSAROLAX, Gabb, 1864. Cretaceous. L. c., ii, 195, t. 60, f. 89.

Section VII. PTEROCERELLA, Meek. Cretaceous. L. c., ii, 195, t. 60, f. 90.

Section VIII. LISPODESTHES, White, 1875. Cretaceous. L. c., ii, 194, t. 60, f. 86.

Section IX. HELICAULAX, Gabb, 1868. Cretaceous. L. c., ii, 194, t, 60, f. 85.

Section X. DIMORPHOSOMA, Gardner, 1875. Cretaceous. L. c., ii, 194.

Section XI. MONOCYPHUS, Piette, 1876. Lip palmated, widely separated from the spire and canal, with an anterior sinus; anterior canal short. Jurassic. *A. camellus*, Piette. (Brachystoma, Gardner, 1876, appears to be founded on an imperfect Aporrhais, having a very long spire. *B. angulare*, Seeley. Gault).

Genus DIARTEMA, Piette, 1864.

Shell Ranelliform, with continuous varices on each side of the spire; lip thick, dilated with a simple or slightly undulating margin, and a slight anterior sinus; anterior canal short, straight, posterior canal small. Jurassic.

Section CYPHOTIFER, Piette, 1876. Jurassic. S. and S. Conch., ii, 195.

Genus ALARIA, Morris and Lycett, 1850.

Jurassic. S. and S. Conch., ii, 195, t. 60, f. 91.

Section I. ALARIA (*sensu stricto*). Varicose.

Section II. DICROLOMA, Gabb, 168. No varices, lip two- or three-digitate. Jurassic, Cretaceous. S. and S. Conch., ii, 194, t. 60, f. 88.

Section III. ANCHURA, Conrad, 1860. L. c., ii, 194, t. 60, f. 84.

Subgenus DIEMPTERUS, Piette, 1876.

Jurassic. Structural and Syst. Conchology, ii, 195.

Subgenus SPINIGERA, d'Orb., 1850.

Jurassic. Structural and Syst. Conch., ii. 192, t. 60, f. 79, 80.

Subfamily Struthiolariinæ.

Genus STRUTHIOLARIA, Lam., 1812.

Animal with the outer mantle-margin simple, tentacles cylindrical; eye pedicels short, adnate with the tentacles externally; foot broad and short. Operculum short, claw-shaped, with an apical projection.

Shell imperforate, oval oblong; spire turreted; aperture truncated in front; lip entire, thickened, sinuous, prominent in the middle, inner lip callous, expanded. *Southern Seas. S. nodulosa*, Mart.

Section I. STRUTHIOLARIA (*sensu stricto*).

Section II. PELICARIA, Gray, 1857. Spire of adult covered with enamel; outer lip sinuous, thin. *S. scutulata*, Mart.

Section III. LOXOTREMA, Gabb, 1878. S. and S. Conch., ii, 196, t. 60, f. 95.

? Section IV. DOLOPHANES, Gabb, 1872. L. c., ii, 196.

Subfamily Strombinæ.

Genus STROMBUS, Linn., 1758.

The Strombs are powerful, active mollusks, having extraordinary visual powers for gastropods, the eyes being large, with the iris usually colored in concentric zones. Their foot is not adapted for ordinary locomotion, but enables the animal to progress in a series of awkward leaps, and even to right itself by a somersault if placed on its back. The strong teeth and thick quadrangular corneous jaws indicate carnivorous habits, yet the animal is supposed to feed only on dead flesh.

Upon the eyes of Strombus, see an excellent paper by Dr. Paul Fischer, *Jour. de Conch.*, 213, 1861.

They usually inhabit shallow waters, and occur plentifully. The distribution is tropical, and rather restricted for some of the species, whilst others have a very extensive range—as might be expected for the whole group considering that the larva is a free swimming animal provided with six ciliated arms (Macdonald, *Linn. Trans.*, xxiii, 72).

Strombus has existed since cretaceous times, and is represented as late as the quarternary of the Mediterranean region, although not now living in that sea. The fossil forms belonging to the family far exceed in number those now existing, besides showing a variability contrasting with the fixed and readily distinguished characters of most of the recent species.

Strombus gigas, the largest species is still eaten at the island of Barbadoes, and numerous ancient weapons and implements made from its shell have been dug up on that island and elsewhere. It is a common mantel, hearth and garden ornament in the coast portions of the United States. In England it is extensively used in the manufacture of the finer kinds of porcelain; 300,000 have been imported into Liverpool in one year, chiefly for this purpose. It sometimes produces a beautiful pink pearl; but in jewelry it is principally used for carving into cameos for brooches, a purpose for which it is well fitted by the different colored layers of which its shell is composed.

"The perfect development of the large, fine, pedunculated eyes of Strombus, together with its very elongated, powerful, muscular foot and body, and claw-shaped, stout, jagged, horny

operculum, constitute it one of the most active and intelligent of mollusks. It is, in fact, a most sprightly and energetic animal, and often served to amuse me by its extraordinary leaps and endeavors to escape, planting firmly its powerful narrow operculum against any resisting substance, insinuating it under the edge of its shell, and by a vigorous effort, throwing itself forwards, carrying its great heavy shell with it, and rolling along in a series of jumps, in a most singular and grotesque manner" (Arthur Adams, *Narrative Voy. Samarang*, ii, 493).

The classification herein adopted for the subfamily differs but little from that of Messrs. Adams' Genera of Recent Mollusca. The fossil groups have been carefully studied by the late Wm. M. Gabb, in his "Attempt at a Revision of the families Strombidæ and Aporrhaidæ," published in the *American Journal of Conchology*, 1868.

The monographs of the recent species of Strombus include the magnificent folio, "Illustrations Conchyliologiques" of Chenu, Reeve's "Iconica," Kiener's "Coquilles Vivantes," Sowerby's "Thesaurus," and Küster's "Conchylien Cabinet." Reeve's monograph, the most recent of these, was published in 1851, and contains 56 species. That the thirty-three years since that period, usually so prolific in conchological discovery, have failed to add materially to the number of species, is a significant fact, taken in connection with the ancient history of the family.

Section I. Strombus (*sensu stricto*).

S. gigas, Linn. Pl. 1, figs. 2–4.

Epidermis light yellowish brown, beneath which the color is fawn-white, interior polished, rose-color. Length, 9–12 inches.

West Indies, Florida, N. South America.

Chisels and other implements manufactured of this shell are found in the Florida shell-mounds. It lives in 2–3 fathoms water, on sand; eats *Sphærococcus confervoides*, Agard. The young shell (fig. 4) is *S. lucifer*, Linn.

S. Goliath, Chemn. Pl. 1, fig. 5.

Whorls spirally grooved in double rows, plicately tubercled

round the upper part, tubercles rounded, obtuse; orange-brown, aperture similar in color, becoming deeper within.

Length, 8–10 inches.

West Indies.

A rare shell, closely related to, perhaps a variety of *S. gigas.*

S. GALEATUS, Swainson. Pl. 1, fig. 6.

Yellowish white, under an olive-brown epidermis; aperture whitish, the lip and columella tinged with orange-brown.

Length, 8–10 inches.

Panama to *Mazatlan*, *Acapulco.*

It is *S. galea*, Wood, and *S. crenatus*, Sowb.

S. COSTATUS, Gmelin. Pl. 1, figs. 7, 8.

Indistinctly banded and marbled with chestnut and white under a yellowish-brown epidermis; aperture whitish, tinged with light orange or pink. Length, 5–6 inches.

West Indies.

Better known under the subsequently published name of *S. accipritrinus*, Lam. *S. inermis*, Swains. (fig. 8), is merely a state of the species with less-developed spines. *S. latus*, Gmel. (= *dilatatus*, Lam., not Swains.) is probably the same form.

S. BUBONIUS, Lam. Pl. 2, fig. 11.

Spire with coarse impressed spiral striæ, shortly tuberculate at the sutures; body-whorl with a shoulder-row of short spines or tubercles, with usually two somewhat obsolete inferior rows of knobs, and coarse revolving riblets; orange-brown or pink-brown, marbled with white, under a brown epidermis, aperture white, tinged with light brown on the lips and columella.

Length, 4 inches.

Senegal and *Cape Verd Islands.*

It is *S. fasciatus*, Gmelin, not Born, *S. coronatus*, Defrance. It is a fossil of the Mediterranean region.

S. INTEGER, Swainson. Pl. 2, fig. 12.

Shell ventricose, solid, white; spire elongated, conical; last whorl nodulose behind; lip thick, rounded, white.

The above is the original description, and reference is made to Lister, pl. 856. This represents an immature shell, rather difficult to identify, and which all the monographers have agreed to

consider a doubtful species. Prof. Mörch, however, considers it a good species and says: "In 1869 I obtained from Mr. Landauer at Frankfurt, a specimen from a French collection marked '*S. inermis*, Florides,' exactly corresponding to Lister's figure. It is the only one I recollect to have seen." *Mal. Blatt.*, xxiv, 17

S. PUGILIS, Linn. Pl. 2, figs. 13–15; Pl. 1, figs. 9, 10.

Spire and lower part of body-whorl spirally striate, the spire-whorls and shoulder of body-whorl sharply spinose; deep orange-brown, covered by a thin epidermis, with an indistinct median lighter band; aperture and wide columellar callus orange or carnelian-red, or sometimes purple towards the base of the lip. Length, 8 inches.

So. Carolina—West Indies, Brazil.

There are varieties with the spines horizontally (fig. 14) and vertically (fig. 15) compressed.

Var. ALATUS, Gmelin. Figs. 9, 10.

Spire nodulous, not spinose, body-whorl also without spines, the shoulder indistinctly nodulous or smooth; color yellowish white and dark chestnut, marbled or disposed in zigzags, sometimes light-banded in the middle; epidermis thin, aperture and columella deep orange to carnelian, more or less tinged with dark purple.

The above describes a typical example of this variety, and its characters are usually sufficiently permanent for its distinction, even as a species; but intermediates between it and *S. pugilis* so completely connect the two, that those who have had the best opportunities for studying them, consider them synonymous. *S. pyrulatus*, Lam. (fig. 10), is identical with *S. alatus*. *S. dubius*, Sowb. (fig. 16) is a young shell.

S. GRACILIOR, Sowb. Pl. 2, fig. 17.

Pale yellowish or orange, with a thin epidermis, sometimes faintly white-banded in the middle; aperture whitish, or pink-white, the lip often margined with orange. Length, 3 inches.

Panama to Mazatlan; La Paz, L. California.

Lighter in color, thinner, smoother (scarcely striate on the spire), with closer, smaller, shorter spines than *S. pugilis;* yet evidently derived from the same parent stock.

S. CANARIUM, Linn. Pl. 2, figs. 18–20; Pl. 3, fig. 21.

Densely longitudinally marked with zigzag alternate white and chestnut lines; aperture white. Length, 2–2·5 inches.

Red Sea, *Indian Ocean*, *Philippines*.

It is *S. Vanicorensis*, Quoy.

Var. ISABELLA, Lam. Figs. 20, 21.

Yellowish or orange-brown, not lineated; sometimes obscurely doubly broad-banded with light chocolate.

The banded state is *S. tæniata*, Quoy (fig. 21). Occasionally a specimen occurs combining the coloring of type and variety.

S. GRANULATUS, Gray. Pl. 3, fig. 22.

Spire-whorls each with a single, body-whorl with three rows of nodules; white, with interrupted zigzag markings and maculations of chestnut, aperture white, the outer lip granulated within the margin, inner lip yellowish brown. Length, 3·5 inches.

Panama to *Mazatlan; Galapagos Is.*

Section II. EUPROTOMUS, Gill.

S. LENTIGINOSUS, Linn. Pl. 3, figs. 23, 24.

White, maculated and coarsely reticulated with chocolate, chestnut or grayish brown, often with several indistinct bands of spots; aperture yellowish white, often blush-red or orange-brown farther within, outer lip smooth, much thickened on the edge and crossed by broad yellowish brown or chestnut bands. Length, 3–4 inches.

Philippines, *New Caledonia* to *Viti Islands; Zanzibar.*

Not the most characteristic species of the section, but I commence with it because of its relationship in form with *S. granulatus*—which I have placed at the end of Section I.

S. PAPILIO (Chemn.), Dillwyn. Pl. 3, fig. 25.

Shell noduled throughout in revolving rows, and coarsely spirally striate and granose, strongly tuberculated on the shoulder and spire; whitish, blotched and lineated with chestnut; columella carnelian-tinted; aperture purplish or nearly black with revolving, irregular, close narrow threads; outer lip thick-margined, with chestnut broad cross-bands.

Length, 2–3 inches. *Philippines*; *Zanzibar.*

It is *S. exustus*, Swainson, and *S. adustus*, Swainson, of Reeve.

S. LACINIATUS (Chemn.), Dillwyn. Pl. 3, fig. 26.

Whitish, marbled in a zigzag manner with chestnut, indistinctly light-banded beneath the markings; margin of outer lip thickened, crossed by broad chestnut bands; aperture yellowish or orange-white, becoming rich dark crimson within.

Length, 4 inches.

Moluccas, *Philippines*, *New Caledonia* to *Viti Islands*.

S. cristatus, Lam., is a synonym.

S. LATISSIMUS, Linn. Pl. 3, fig. 27.

Orange-brown, irregularly longitudinally strigate with chestnut, with white maculations, forming several revolving bands; aperture flesh-white; outer lip broadly inflected with orange-brown bands crossing the margin. Length, 6–8 inches.

Amboina, *Japan*, *Philippines*, *Viti Is.*

S. alata, Schum., is a synonym.

S. PONDEROSUS, Phil. Pl. 3, fig. 28.

Obsoletely spirally ribbed and striate, nearly smooth, spire nodulous; whitish, variously longitudinally shaded, striped and spotted with chestnut, and tinted with light violaceous, especially on the callous expansion of the inner lip; aperture and columella pale carnelian, inflected margin of outer lip broadly chestnut-banded. Length, 5–6 inches.

New Caledonia (Brazier); *Society Islands* (Schmeltz).

S. Thersites, Gray, is a synonym.

S. TAURUS, Reeve. Pl. 4, fig. 34.

Yellowish white, maculated and strigated in a zigzag manner with yellowish chestnut, expansion of columellar lip bright orange-brown, interior of aperture purple-tinted, margin of outer lip with light chestnut square spots. Length, 3·5 inches.

Admiralty Islands.

"This remarkable shell," says Reeve, "is curiously intermediate in its generic characters between Strombus and Pterocera. In detail of pattern and sculpture it resembles *S. laciniatus*, but there is a large central oblique tubercle on the back, and the lip is thickened into two very large obtuse oblong tubercles, the upper part being produced into two decided Pterocera claws.

one of which is prolonged in a curved manner to the extent of an inch and a half. The specimen has rather the appearance of being malformed; but notwithstanding this seeming irregularity of growth, there is no doubt whatever of its being specifically distinct from any hitherto described form."

Section III. Monodactylus, Klein.

S. Peruvianus, Swainson. Pl. 3, fig. 29.

Whorls spirally ribbed, obtusely angled and tuberculated on the shoulder, middle tubercle on the back very prominent; yellowish chestnut, sometimes a little tessellated, aperture and columella yellowish or orange-brown, deepening in the interior to a deep orange-red. Length, 5–7 inches.

Peru to *W. Columbia.*

In old specimens the interior of the outer lip is often radiately ridged.

S. tricornis, Lam. Pl. 3, figs. 30, 31.

Nearly smooth, very obsoletely spirally ribbed, the shoulder and spire tuberculated, dorsal tubercle of body-whorl long, laterally compressed, very prominent, two other dorsal tubercles also somewhat enlarged; whitish closely irregularly lineated with orange-chestnut; aperture blush-white or rosy.

Length, 4·5 inches.

Red Sea, Isle of Bourbon, Seychelles, Philippines.

Is a smaller, lighter species than the preceding, with the lip more narrowly produced into a lobe behind, interior always smooth, spire longer, aperture light violaceous instead of orange-red. It is not West Indian, as supposed by Sowerby. It is *S. orientalis*, Johnston, and *S. pertinax*, Duclos.

S. bituberculatus, Lam. Pl. 4, figs. 32, 33.

Grayish white, marbled and banded with chestnut or chocolate, aperture yellowish white, deepening to rose-color.

Length, 3 inches.

West Indies; N. South America.

It is *S. lobatus*, Swainson, *S. quadratus*, Perry, *S. raninus*, Gmelin. The latter name has priority, of course, but I prefer to retain the name under which the species has become so well-known.

S. GALLUS, Linn. Pl. 4, figs. 35, 36.

Yellowish white, clouded and maculated with chestnut; aperture whitish, more or less tinged with orange-brown.

Length, 4–6 inches.

West Indies.

Reeve and some earlier authors have given the Red Sea as locality for this species, which is an error; probably originally caused by confounding it with *S. tricornis.*

S. AURIS-DIANÆ, Linn. Pl. 4, figs. 37, 38.

Shell varying from nearly smooth to roughly nodulous, the nodules developed here and there upon revolving rounded ribs, spire-whorls and upper part of body-whorl angulated and nodose on the angle, callus of the inner lip far-spreading, sometimes mounting the spire to near its apex, interior of outer lip with posterior radiating ridges; orange-brown or light chestnut, speckled and marbled with white, polished; lip and columella callus whitish, more or less tinged and deepening within the aperture to bright carnelian. Length, 3 inches.

Indian Ocean, *Mauritius*, *Philippines* to *Society Islands.*

The synonyms include *S. Lamarckii*, Gray; *S. guttatus*, Martini; *S. striatogranosus*, Mörch. Attempts have been made to separate the smoother form as *S. guttatus*, Mart., but any considerable collection embracing specimens from several localities will demonstrate its identity with the more nodose forms.

Var. MELANOSTOMUS, Swainson. Fig. 38.

Shell tinged with black or burnt chocolate color, on the margin of the lip, and its posterior lobe, and on the posterior part (or sometimes covering the whole) of the columellar callus.

S. PACIFICUS, Swainson. Pl. 4, figs. 39, 40.

Shell with revolving rounded ribs and nodules, and angulated whorls, nodulous on the angle, as in the preceding species—which it also resembles in exterior coloration, but the spire is longer, more convex, and the body-whorl narrower. The aperture differs in the lip being radiately ridged throughout instead of at the posterior end only; in the typical form the interior and

columella-callus are yellowish, or ochre-brown, darker between the radiating ridges, tinged on the callus with dark chocolate.

Length, 3 inches.

Japan, *Australia*, *Society Islands*.

This is *S. Novæ-Zelandiæ*, Chemn., *S. acutus*, Perry, *S. aratrum*, Mörch, *S. Chemnitzii*, Pfr.

Var. AUSTRALIS, Sowb. Fig. 40.

Barely distinguishable by its usually shorter lobe, the interstices of the lip ridges not darker colored, and the margin of the lip as well as part of the columellar callus painted deep chocolate.

Section IV. GALLINULA, Klein.

S. VITTATUS, Linn. Pl. 4, figs. 41–44.

Body-whorl usually smooth, sometimes rudely longitudinally plicate in continuation of the ribs of the spire; there is a smooth sutural band, more or less defined by a groove below it; whitish clouded or reticulated with light yellowish or chestnut, often with several revolving bands of darker reticulations; aperture white. Length, 3–4 inches.

Indian Ocean, *China*, *Philippines*.

S. turritus, Lam. (fig. 43), is a slender form, with the spire more drawn out, and the lip not so much expanded; *S. sulcatus*, Chemn. (fig. 44) is probably only a malformed specimen of this species.

S. LISTERI, Th. Gray. Pl. 4, fig. 45.

Differs from the preceding species in the lobe-like posterior expansion of the lip and its large anterior sinus, in the inner face of the lip being smooth instead of radiately ridged, in the absence of the sutural band, and in its much larger size.

Length, 6 inches.

Ceylon.

It may be a monstrosity of *S. vittatus*, but until we have further evidence on the subject it had better be regarded as a distinct species. It was known to Lister, who figured it (Pl. 855) nearly two centuries before Sowerby's publication of it as *S. mirabilis*, in 1870. Gray's description of it in 1852, although in a periodical of wide circulation, appears to have been entirely overlooked.

S. Campbelli, Gray. Pl. 5, fig. 46.

Resembling *S. vittatus* in coloration, but with shorter spire, the sutural band closely plicate, instead of smooth as in *vittatus;* body-whorl smooth, except the revolving grooves at the base.

Length, 2–2·5 inches.

North and East Australia.

Perhaps only a variety of *S. vittatus*.

S. dilatatus, Swainson. Pl. 5, fig. 47.

Spire finely longitudinally plicate, all the whorls with close spiral striæ, no sutural band, interior of lip radiately ridged; yellowish brown or light chestnut, with somewhat obscure whitish maculations, and narrow bands, interstices of the ribs on the inside of the lip, dark chestnut or purplish.

Length, 2–2·5 inches.

Zanzibar, New Caledonia, Japan.

Reeve changed the name to *S. Swainsoni*, on account of *S. dilatatus*, Lam.—but the latter is a synonym of *S. bubonius*, Linn. The shell figured by Lischke for *S. Japonicus* appears to me to = this species.

S. Japonicus, Reeve. Pl. 5, fig. 48.

Longitudinally finely ribbed towards the apex, everywhere closely regularly spirally grooved, upper part of whorls slantingly concave, with the angle obscurely nodose; whitish, stained and variegated with chestnut, encircled with narrow white zones sagittately marked with chestnut; interior white, lip radiately ridged. Length, 2·25 inches.

Japan.

Closely allied to the preceding species, but is narrower, with longer spire, the whorls are concavely shouldered, etc.

S. columba, Lamarck. Pl. 5, figs. 49, 50.

Closely spirally grooved, spire longitudinally closely ribbed, whorls concavely, slantingly shouldered, the angle tuberculated; variegated and banded with orange-brown and white, columella and interior of outer lip both closely ridged, and stained deep chestnut. Length, 2 inches.

? Red Sea, Zanzibar, Philippines, Pelew Is.

Differs from *S. dilatatus* by its ridged inner lip, angulated,

nodulous whorls, by the outer lip being more produced behind, with a narrow, deep sinus anteriorly. *S. orosminus*, Duclos (fig. 50), is a variety with uncolored aperture.

S. LABIOSUS, Gray. Pl. 5, fig. 51.

Spire closely longitudinally ribbed, whorls subangulated and nodose at the angle, everywhere closely spirally grooved, lip strongly winged, and excavated above, ascending the spire but little, radiately ridged within, inner lip smooth; yellowish brown, interior white, interstices of ridges within the lip often deep chestnut. Length, 2 inches.

Australia, *Philippines*.

S. DEFORMIS, Gray. Pl. 5, fig. 52.

Sculpture same as in preceding species, the shell thinner, the lip not so lobular behind, and decidedly ascending the spire; coloring as usual in this group, marbled and tessellated with orange-brown and white, with faint, marbled bands.

Length, 2–2·5 inches.

Red Sea, *Philippines*, *Australia*.

Notwithstanding the differences above pointed out, I have some doubts of the distinctness of this and the preceding species.

S. MARGINATUS, Linn. Pl. 5, figs. 53, 54.

Distinguished at once by its short, conical spire and sharply angulated whorls, the angle closely minutely nodulous, the whorls everywhere spirally grooved, interior of outer lip ridged; marbled with orange-chestnut and white, with some narrow white bands covered by chestnut markings, aperture white. Length, 2 inches.

China, *Philippines*, *Formosa*.

S. robustus, Sowb. (fig. 54), is a synonym.

S. EPIDROMIS, Linn. Pl. 5, fig. 55.

Body-whorl smooth, spirally grooved below; yellowish white, minutely marbled and freckled with light orange-brown; aperture smooth within, white. Length, 2·5–3 inches.

China, *Philippines*, *New Caledonia*.

S. SUCCINCTUS, Linn. Pl. 6, figs. 56, 57.

Upper part of spire minutely longitudinally plicate, spirally closely grooved, body-whorl smooth, spirally grooved towards

the base, with a hump or nodule on the back, near the suture; yellowish white and orange-brown in longitudinal irregular zigzag lines, with several narrow white bands crossed by brown markings, interior white, radiately ridged within the outer lip.

Length, 2 inches.

Indian Ocean, Philippines.

Var. SEPTIMUS, Duclos. Fig. 57.

Spire more exserted, showing a closely nodulous angle on the whorls, body-whorl less distinctly or not at all humped on the back, lip more expanded at the shoulder.

S. FUSIFORMIS, Sowb. Pl. 6, fig. 58.

Smooth, spirally grooved at base and behind the outer lip, spire occasionally varicose, narrowly margined below the suture; inner lip callous, narrow, ridged across, interior of outer lip radiately ridged; lip exteriorly thickened, scarcely expanded; interruptedly marbled and banded with orange-brown and white, aperture white or tinged with dark chestnut.

Length, 1·5 inches.

? Red Sea, Australia.

S. VARIABILIS, Swainson. Pl. 6, figs. 59–61.

Spire plicate, the whorls angulated and nodose on the angle, the plicæ on the body-whorl short, body-whorl narrowly grooved at the base, lip smooth within; white, or yellowish with orange-chestnut zigzag markings, and four narrow white bands, also crossed by the markings, or yellowish white, with chestnut bands, aperture white, columellar lip sometimes with a central chocolate blotch. Length, 2 inches.

Zanzibar, Philippines, Australia, Samoa Is., etc.

S. athenius, Duclos (fig. 61), is a synonym.

S. MINIMUS, Linn Pl. 6, fig. 62.

External coloring and sculpture same as in the preceding species, but usually smaller, the inner lip narrow, thickly callous, running up the spire as far as the outer lip, from which it is separated by a narrow channel; interior white, deepening within to golden yellow. Length, 1·25–1·5 inches.

Philippines, Viti Is.

I have considerable doubt whether the distinctive characters are sufficiently reliable to separate this from the preceding species.

S. Sibbaldi, Sowb. Pl. 6, figs. 63, 64.

Whorls angulated, spirally grooved, angle nodulous, concave above it, body-whorl swollen, lips of aperture ridged; zigzagged with orange-brown over a yellowish surface and lighter bands, aperture white, the columellar lip partially stained deep chestnut. Length, 1·5 inches.

Indian Ocean.

S. deformis, Kiener (in part) and Duclos (fig. 64), to which Tapparone-Canefri has given the name of *S. Kieneri*, is a synonym.

Section V. Canarium, Schum., 1817.

S. urceus, Linn. Pl. 6, figs. 65–67.

Shell smooth, with tuberculated shoulder-angle, narrowly spirally grooved at the base; whitish or yellowish, banded and speckled with chestnut, often tinged with chocolate at the base; interior of outer lip (and often the upper part of the callous narrow inner lip) radiately ridged; lip, aperture and columella deep orange-brown, or chestnut, or more usually deep chocolate or black. Length, 1·75–2·5 inches.

Indian Ocean, Philippines, Australia.

This is *S. ustulatum*, Schum., *S. incisus*. Wood, *S. anatellus*, Duclos (fig. 67).

S. dentatus, Linn. Pl. 6, figs. 68–70; Pl. 7, figs. 67–72.

Whorls strongly plicate, the plicæ usually becoming obsolete about the middle of the body-whorl, forming tubercles where they cross the angle of the shoulder; closely spirally striate, but the striæ usually obsolete about the middle of the body-whorl; columellar lip narrowly callous and with the interior of the outer lip radiately ridged; whitish to yellowish brown, generally speckled and banded with gray, light olive, orange or chestnut; columellar lip and interior orange-brown to purple-chocolate. Length, 1·5 inches.

Red Sea to *Philippines*,

New Caledonia—Viti Islands, Mauritius.

The sculpture, like the coloring varies; sometimes the body whorl is smooth below the strong shoulder-tubercles, sometimes these are not so strong, and continue below as flexuous plica-

tions—and these plications are distant or close, varying in number.

S. plicatus, Lam. (Pl. 7, fig. 70), and *S. olydius*, Duclos (Pl. 6, fig. 68), are synonyms.

The difference between this species and *S. urceus* is so slight, and there is so much variation in the shells, that it is very doubtful whether their separation can be maintained; several distinguished modern conchologists have united them.

Var. ERYTHRINUS, Chemn. Figs. 69, 71.

Shell smaller and narrower, the spire generally more exserted; the swollen outer border of the aperture is usually darker than the rest of the exterior surface. Length, 1–1·5 inches.

Red Sea, Australia.

S. elegans, Sowb. (fig. 71), is a synonym of this variety.

Var. RUGOSUS, Sowb. Fig. 72.

Ribs and spiral sculpture both strong, extending over the body-whorl, which is rugose throughout.

Corea to *Polynesia.*

S. corrugatus, Ads. and Reeve, is a synonym.

Var. PULCHELLUS, Reeve. Fig. 70.

Shell wider, the outer lip well expanded, particularly behind, forming a rather broad shoulder; surface very rugose, usually with a second inferior band of small tubercles on the body-whorl. Length, 1–1·25 inches.

Philippines.

L. FLORIDUS, Lam. Pl. 7, figs. 73–76, 80, 83.

Whorls smooth or obsoletely spirally striate, grooved at the base of the body-whorl; spire short, composed of round-shouldered whorls, obtusely tuberculate; body-whorl with usually only two or three compressed tubercles on the back, at the shoulder, columella and interior closely ridged; white and yellowish, brown or chocolate variegated in interrupted bands, maculations and spots; aperture and columellar lip white, with the ridges colored pink or chocolate. Length, 1–1·5 inches.

Zanzibar, Japan, Australia to *Viti Islands.*

Sometimes the surface color is almost entirely yellowish brown, chestnut or chocolate.

The synonyms are *S. flammeus* (Link), Mörch, *S. mutabilis*,

Swainson, *S. flosculosus*, Mörch, *S. gibberulus*, Meuschen (not Linn.), and *S. epimellus*, Duclos (figs. 80, 83), the latter somewhat singularly marked with color.

S. HÆMASTOMA, Sowb. Pl. 7, fig. 78.

Closely longitudinally ribbed throughout, and occasionally varicose, shoulder tuberculated, closely spirally striated, aperture and columella ridged; pinkish or yellowish white, indistinctly maculated, columellar lip and interior deep orange-red or chestnut. Length, 15–18 mill.

Mauritius.

S. HELLII, Rousseau. Pl. 7, fig. 79.

Broadly oval, regularly ribbed, crossed by spiral striæ, columellar lip and interior closely ridged; yellowish brown, interior and columella purplish. Length, 1 inch.

Zanzibar.

Reeve supposed this to be a possible variety or monstrosity of *S. hæmastoma.*

S. SCALARIFORMIS, Duclos. Pl. 7, fig. 81.

Sculptured and colored like the preceding species, but differing widely in form. Length, 23 mill.

China.

I know nothing about this or the preceding species, except from the original descriptions and figures.

S. FASCIATUS, Born. Pl. 7, figs. 82, 77.

Whorls nearly smooth, sharply tuberculated at the shoulder; whitish, often delicately freckled with pale yellowish brown, with revolving rows of dark chestnut or chocolate sagittate characters; interior orange-red. Length, 1·5–2·25 inches.

Red Sea, Indian Ocean, Philippines?

The synonymy includes *S. polyfasciatus*, Chemn., *S. Persicus*, Swainson, *S. subulatus*, Herbst, *S. flavigula*, Meuschen, and *S. lineatus*, Lam. *S. ismarius*, Duclos (fig. 77), appears to be a specimen (perhaps old and worn) in which the markings are indistinct.

S. MACULATUS, Nuttall. Pl. 7, fig. 84.

Shell smooth, slightly finely spirally striate on the spire and upper part of body-whorl, the latter narrowly grooved at the base; white clouded and maculated with chestnut and chocolate,

or yellow or orange-brown, maculated with darker shades, and with a maculated white band; aperture white.

Length, ·75–1·25 inches.

Sandwich, *Paumotus and Friendly Islands.*

Well characterized by its form, swollen posteriorly and not tuberculate.

S. GIBBERULUS, Linn. Pl. 8, fig. 85.

Shell gibbous, smooth. spire occasionally varicose, body-whorl grooved at the base; columella smooth, interior of aperture radiately striate; mottled and hieroglyphically marked with yellowish brown and white, the markings often arranged in a few or numerous interrupted revolving bands; aperture tinged violaceous, scarlet, dark purplish brown, etc.

Length, 1·5–2·5 inches.

Zanzibar, *Natal*, *Red Sea*, *Indian Ocean*, *Mauritius*, *Philippines*, *New Guinea*, *Viti Islands*, *Paumotus*, *etc.*

The synonymy includes *S. Mauritianus*, Issel, and var. *rhodostomus*, Mörch.

S. BULBULUS, Sowb. Pl. 8, fig. 86.

Smooth, sulcate at the base; marbled, freckled and sometimes interruptedly banded with chestnut and white, the white often tinged with light violaceous, aperture and columella dark purplish chocolate. Length, 1·5–1·75 inches.

Philippines to *Viti Islands.*

S. TEREBELLATUS, Sowb. Pl. 8, fig. 87.

Smooth, obsoletely grooved at the base, outer lip radiately ridged within; yellowish white, with clouds and zigzag markings of orange-brown or chestnut, interior ridges chestnut.

Length, 1·5–1·75 inches.

Philippines to *Viti Islands.*

S. SAMAR (Chemn.), Dillw. Pl. 8, fig. 88.

Smooth, polished, plicate, obsoletely grooved at the base, margin of lip tridentate anteriorly, interior of aperture radiately ridged; marbled and speckled with orange-brown or chestnut and white, interior tinged with purplish chocolate.

Length, 1·75 inches.

Philippines, *Australia*, *Society Is.*, *Paumotus Is.*

The synonymy includes *S. tridentatus*, Lam., *S. Samarensis*,

Reeve. Some authorities identify this species with *S. dentatus*, Linn.; I have otherwise interpreted the latter.

S. Cailliaudi, Jay. Manual, vi, Pl. 34, fig. 18.

Shell spirally striate, chocolate-brown, interior of aperture tinged with the same color. Length, 40 mill.

Hab. unknown.

Probably a young Strombus, although described as a Conus. I am not able to identify it. I have figured it in the sixth volume of this work, as above.

Section VI. Conomurex, Bayle, 1884.

S. Mauritianus, Lam. Pl. 8, figs. 89, 90.

White, with chestnut or chocolate longitudinal interrupted zigzag lines and spots, arranged in revolving bands, aperture ridged within, carnelian or rose-red. Length, 2-2·5 inches.

Mauritius.

S. cylindricus, Swainson, and *S. coniformis*, Sowb. (fig. 90), are synonyms; the latter retaining obtuse nodules which generally are only seen upon young specimens.

S. Luhuanus, Linn. Pl. 8, figs. 91, 92.

Shell often covered with a dark epidermis, under which the markings are the same as in the preceding species, the columella very dark chocolate or nearly black. Length, 2-2·5 inches.

Philippines, *Australia*, *New Guinea*, *Viti Is.*, etc.

No differences of form which have been pointed out as distinguishing this and the preceding species, hold good when an extensive suite is examined; the only real distinction is the narrow black deposit overlaying the columella in *S. Luhuanus*, of which *S. Mauritianus* never appears to show even a trace. I figure a very curious anomalous growth of this shell (fig. 92), preserved in the Museum of the University of Ghent.

S. labrosus and *S. lævilabris* of Menke, are synonyms.

Unidentified Species of Strombus.

S. tuberculatus, S. pusillus, S. Peruanus, S. elatus, S. crassilabrum, all of Anton. *No locality.*

S. glabratus, Sowb. = *Nassa obliqua*, Kiener. Manual, iv, 27.

S. cancellatus, Pease. *Sandwich Islands.*

Genus PTEROCERA, Lam., 1799.

Properly speaking there is only a difference of convenience between this species and Strombus; that is, no important structural differences are involved. Pterocera is a stromb having the outer lip on the shell prolonged into long digitate processes resulting from similar digitations of the mantle-margin of the animal. Certain of the strombs, those of the section Euprotomus, for instance, have a tendency to digitation, yet do not bridge the gap between the two groups. The Pteroceri as thus defined, consist of ten species, rather constant in character, confined, as to recent distribution, to the tropical seas of the Indo-Pacific, Australian and Polynesian provinces, and not certainly found in a fossil state.

The genus has been carefully reviewed by Prof. Theo. Gill (Am. Jour. Conch., v, 120), and I have followed him mainly in the synonymy, and descriptions. As will be seen by referring to p. 101 of this monograph, I have adopted two sections for the genus Pterocera; these correspond to genera in Prof. Gill's arrangement, the last containing two species (*S. chiragra* and *S. rugosa*), whilst the first is synoptically tabulated by him as follows:

I. Lips smooth (my Subsection I. Heptadactylus).
  I *a*. Body-whorl tuberculated at the angle.
  Lip reflected; columella with callus diffused, *P. lambis.*
  Lip inflected; columella with callus stratified, *P. crocata.*
  I *b*. Body-whorl unarmed at angle, *P. bryonia.*
II. Lips rugose (my Subsection II. Millipes).
  II *a*. Intercalary digitations none.
  Posterior digitation with a basal lobe, *P. scorpio.*
  Posterior digitation simple, *P. pseudoscorpio.*
  II *b*. Intercalary digitations developed.
  Posterior digitation simple, *P. millepeda.*
  Posterior digitation with a basal lobe
    Labral digitations eight; labral wrinkles very distinct, *P. elongata.*
  Labral digitations ten; labral wrinkles faint, *P. violacea.*

The Pteroceræ have been monographed also by Reeve, Sowerby and Kiener.

Section I. PTEROCERA (*sensu stricto*).

Subsection I. *Heptadactylus*, Klein.

P. LAMBIS, Linn. Pl. 8, figs. 1–3.

Angular fasciole or revolving rib carinated on spire, on the body-whorl provided with two enlarged, compressed tubercles; inner lip with the callus spreading; outer lip with the margin (normally) somewhat reflected, with the digitations bending outward and rather small, and with the antesinual lobe undulated; lips and aperture whitish or yellowish brown, becoming more or less sanguineous within. Length, 6–8 inches.

Indian Ocean, Zanzibar, Philippines, New Guinea, Society Islands, etc.

P. AURANTIA, Lam. Pl. 9, fig. 5.

Angular fasciole carinated on spire, and on the last whorl armed with two enlarged tubercles; inner lip with the callus somewhat restricted, folded near the aperture; outer lip with its margin somewhat inflected, the digitations successively more recurved, and the antesinual lobe tridentate; lips more or less orange or saffron-colored. Length, 5–6 inches.

Philippines, Mauritius, etc.

P. crocata, Link, has priority, but it is unnecessary to displace a well-established name in favor of a recently resurrected one, published very obscurely.

P. BRYONIA, Gmelin. Pl. 8, fig. 4; Pl. 9, fig. 8.

Angle coronated or tuberculated on spire, unarmed on the last whorl; inner lip with diffused callus, outer lip with erect margin, with six moderate digitations, and with the antesinual lobe little undulated; lips whitish or lurid. Length, 10–15 inches.

Red Sea, Indian Ocean, Mauritius, Japan, Philippines, Australia, Society Islands.

The synonymy includes *P. truncata*, Lam., *Pyrula Bengalina*, Grat. (juvenile), *P. Sebæ*, Val., and *P. Sowerbyi*, Mörch. Mörch has distinguished the two latter as species, but they do not present any claim to even varietal rank; not only is the species very variable within its usually recognized limits, but certain specimens before me indicate a transition to *P. lambis*.

Subsection II. *Millipes*, Klein, 1753.

P. SCORPIO, Linn. Pl. 9, fig. 6.

Labrum with a prominent internal transverse white ridge in front of the concavity of the dorsal tubercle; laterally inflected, ribbed between the spines, and with a dentated margin; the spines nodose, and the posterior one auriformly lobed at the left base; aperture orange-red, the transverse ridges within the outer lip and on the inner lip whitish, their interstices purple or nearly black. Length, 5–6 inches.

Indian Ocean, *Philippines.*

It is *P. nodosa*, Swains.

P. PSEUDOSCORPIO, Lam. Pl. 9, fig. 7.

Labrum with no distinct internal ridge behind, and with the concavity of the tubercle mostly in advance of the columellar fold; moderately inflected, with single dentiform lobes between the angular and median, and median and postsinual digitations; the latter obsoletely or not at all nodose, and the posterior without basal lobe. Color as in preceding species.

Length, 6–7·5 inches. *Zanzibar*, *Indian Ocean.*

P. MILLEPEDA, Linn. Pl. 9, fig. 9.

Digitations separated by secondary ones intercalated at the right margin; angle armed with four digitations, the uppermost (rarely absent) being an intercalated one; posterior digitation simple; laterals, especially the primary, much recurved; wrinkles on the lips moderately developed, interstices not so deeply colored as in the preceding species. Length, 5–6 inches.

Indian Ocean, *Mauritius*, *N. Guinea*, *Philippines.*

P. ELONGATA, Swainson. Pl. 9, fig. 10.

Angle armed with the three normal digitations; posterior digitation furnished with a lobe at its left base; lateral digitations straight; lips with well-developed wrinkles; color as in preceding species. Length, 5–6 inches.

Indian Ocean.

P. crocea, Sowb., is a synonym.

P. VIOLACEA, Swains. Pl. 9, fig. 11.

Angle armed with three digitations; a posterior and an

anterior median fasciole in place of the normal single fasciole; posterior digitation with an elongated lobe at its left base; lateral digitations straight or little curved; all the digitations open, channeled; wrinkles within the labrum prominent, on the labium faint, often obsolete anteriorly; aperture whitish or orange-stained, violaceous only within the throat.

Length, 4–5 inches.

Indian Ocean, Zanzibar.

Undetermined Species.

P. YOLDII, Mörch. *Hab. unknown.*

P. ROBUSTA, Swains. *Hab. unknown.*

Section II. HARPAGO, Klein, 1753.

P. CHIRAGRA, Linn. Pl. 10, fig. 13.

Angular fasciole or revolving rib tuberculated, the others almost unarmed, the antesinual with a compressed tubercle near the base of the digitation; lips rosaceous, with faint wrinkles; sutural digitation with a canal open at base, the outer border being bent outwards and attached above the angle of the body-whorl, on which the digitation is chiefly bent and accumbent.

Length, 6–10 inches.

Indian Ocean, Philippines, N. Caledonia, Polynesia.

P. Kochii, Freyer, is a synonym.

P. RUGOSA, Sowerby. Pl. 10, fig. 12.

Revolving fascioles except the sutural and anterior with prominent tubercles; lips with very prominent, often white wrinkles strongly contrasting with the deep purplish or blackish ground-color; basal posterior digitation with its canal closed by the reflection of its margins, and accumbent on the middle of the spire. Length, 5–7 inches.

Zanzibar, Society Islands, etc.

Probably only a variety of the preceding species. It is *P. chiragra*, Lam., in part, and *P. arthritica*, Mörch.

Genus ROSTELLARIA, Lamarck, 1799.

"Rostellaria has all the habits of the Strombidæ, progressing by means of its powerful and elastic foot which it places under the shell in a bent position, when suddenly, by a muscular effort, it straightens that organ, and rolls and leaps over and over. It is, however, far more timid and suspicious than Strombus, which has a bold disposition. On the low sandy beach, near the mouth of the Lundu River, in Borneo, dead shells of *Rostellaria rectirostris* are numerous, but generally in very imperfect condition. At the small fishing village of Samahitan I inspected a large heap of these shells, which the Malays had brought together for the purpose of turning them into lime. On inquiring of these poor fishermen whether it were possible to obtain them in a living state, we were informed that they never procured them in their nets, but that they lived in deep water at a considerable distance from the shore. The animal of *Rostellaria fissa* does not differ from that of Strombus, and is of a dull brown color, varied with lighter brown. It is, however, one of the most lively among mollusks, jumping several inches, and throwing itself about with the most astonishing activity. It has none of the extreme timidity of the former mentioned species."—*Arthur Adams*, Narrat. Voy. Samarang, ii, 492.

R. CURVIROSTRIS, Lam. Pl. 10, figs. 14–16; Pl. 11, fig. 26.

Upper portion of the spire longitudinally plicate, the rest of the shell smooth; lower part of lip-margin, six- or seven-dentate; yellowish brown, aperture white. Length, 6–8 inches.

Red Sea, Moluccas.

R. magna, Schröter, has considerable priority of publication, but I decline to depose a very well-known name in its favor. It is *R. dentula*, Perry, *R. brevirostra*, Schum., and *R. fusus*, Gmelin, not Linn.

Var. CURTA, Sowb. Fig. 15.

The canal straight.

Var. LUTEOSTOMA, Angas. Fig. 16.

Aperture golden yellow, lip-margin with five digitations, canal curved.

R. FUSUS, Linn. Pl. 10, fig. 17; Pl. 11, fig. 21.

Much more slender than the preceding species, the spire and canal longer, lip-margin toothed throughout, with five or six, strong, well-marked short digitations; yellowish brown, aperture white. Length, 6–8 inches.

China.

It is *R. clavus*, Gmel., *R. rectirostris*, Lam., *R. subulata*, Schum., *R. unicornis*, Dillw.

Var. MELANOCHEILUS, A. Ad. Fig. 21.

Lip between the digitations, and sometimes the interior of the aperture stained purple-black.

R. POWISII, Petit. Pl. 11, fig. 22.

Closely spirally ridged, the interstices longitudinally striate, canal short, lip-margin five-toothed, exteriorly thickened, yellowish, or orange-brown, aperture white. Length, 2–2·5 inches.

China.

A somewhat rare shell; a specimen was sold a few years ago for 200 francs (Jour. de Conch., 228, 1877).

R. FISSA, Dillw. Pl. 11, fig. 23.

This shell, figured by Chemnitz, has not been found in any European collection, and nothing is known of its locality. It is *R. Favanni*, Pfr., and *R. serrata*, Perry.

R. DELICATULA, Nevill.

Thin, translucent, pale ochraceous brown, lineated on the last whorl with four narrow white bands each of which terminates in one of the four digitate processes of the lip, canal shorter than in the other species, first three or four whorls smooth, the next three or four faintly but regularly spirally striated, the striæ becoming obsolete on the last two whorls, except at the base of the body-whorl. L. 76 mill., of canal 6·5 mill.

Arracan, dredged in deep water.

Unfigured and unknown to me except by the original description published four years ago.

R. MARTINII, Marrat. Pl. 11, fig. 24.

Whorls with close punctate revolving striæ throughout, bi-

sulcate near the suture; lip five- or six-dentate; orange-brown, obscurely livid-banded near the suture. Length, 6·25 inches.

Philippines.

Two specimens known.

Subgenus RIMELLA, Agassiz, 1840.

R. CANCELLATA, Lam. Pl. 10, figs. 18, 20.

Whorls cancellated, occasionally varicose, posterior canal produced upon the spire, which it ascends in a curved line, interior of outer lip dentate; pale yellowish brown, indistinctly banded with pale chestnut. Length, 1–1·25 inches.

Philippines.

R. CRISPATA, Sowb. Pl. 10, fig. 19.

Shell cancellated by rather sharp narrow ribs, and revolving riblets, occasionally varicose; posterior canal short, curved strongly to the right; yellowish white, pale chestnut-banded. Length, 1 inch.

Philippines, China.

Distinguished from *R. cancellata* by its more ventricose form, and short posterior canal.

R. SPECIOSA, H. and A. Adams.

Shell reticulated, more lanceolate than *R. cancellata*, not ending anteriorly in a recurved beak, with the varix of the outer lip plain externally, and with the posterior canal of the aperture faintly developed and only extending as far as the penultimate whorl. Length, 1 inch.

Hab. unknown.

An unfigured species. Is it *R. crispata?*

R. TYLERI, H. and A. Adams.

Cancellated, posterior canal extending to the third whorl and curved, outer lip corrugately plicate within, with an anterior, conspicuous, sharp tooth; yellowish with four chestnut bands. Length, 21 mill.

China Sea.

Unfigured.

Genus TEREBELLUM, Klein, 1753.

Mr. Arthur Adams, in his Narrative of the Voyage of the "Samarang," makes the following remarks upon this mollusk:

"In its habits the animal of the Terebellum is exceedingly shy and timid, retracting its body into the shell on the slightest alarm. It will remain stationary for a long time, moving its tentacles about cautiously in every direction, when, suddenly, it will roll over with its shell, and continue again perfectly quiet. They appear to have all the muscular energy, vivacity, and, doubtless, predatory boldness possessed by the Strombi, which they also resemble in their perfectly organized eyes, and quickness of vision. Mr. Cuming informs me that he has seen them leap several inches from the ground, exactly as I have seen the animal of *Strombus gibberulus*. On one occasion, a beautiful specimen was lost to the above-mentioned enthusiastic collector, by the animal suddenly leaping into the water, as he was holding and admiring it in the palm of his hand. Those I kept in confinement died in a few days, and appear to be of a more delicate constitution than the hardy Strombus. There appears to be a very trifling muscular connection between the animal and its shell.

"From my observations on the animal of Terebellum, I should imagine the spotted variety to be perfectly distinct as a species. In this, which may be called *T. maculosum*, the proboscis is of a whitish-brown color, reddish towards the tip; the body is of an opaque pearly white, the mantle transparent; the foot semi-pellucid white; the ocular peduncles are mottled with dark red, and the pupil black. The front of the mantle, edging the anterior part of the shell, is colored with a black line, forming its margin.

"In the common species, *T. subulatum*, the eye-peduncles are punctulated with red-brown, as is likewise the upper and under part of the fore-portion of the body. The body is opaque pearly white, with three large, irregular-shaped red-brown blotches on the fore-part. The under surface of the foot is light brown, with a white cross-like marking of a deeper brown. Doubtless, when the animal of the variety covered with zigzag markings shall have been discovered, it will also be found to be specifically distinct."

A difference in the color-markings of the animal has precisely the same value as if upon its shell, and the variations of the latter, in the present instance, are so unstable as to preclude the possibility of separating species, with sufficiently distinctive characteristics. The genus has but one recent representative, the species described below. It is related to the Strombs through *Strombus terebellatus*.

T. SUBULATUM, Lam. Pl. 11, figs. 27–30.

Shell smooth, shining, suture linearly grooved, enamelled; yellowish white, with chestnut or chocolate dots, freckles or zigzag lines, often somewhat indistinctly banded.

Length, 2–3 inches.

Indian Ocean, Java, China Sea, Philippines, New Caledonia, Viti Is., Mauritius.

It is *Bulla terebellum*, Linn., *T. punctatum*, Chemn., *T. maculosum*, Ads., etc.

Subfamily Aporrhainæ.

Genus APORRHAIS, Dillwyn, 1823.

Section 1. APORRHAIS (*sensu stricto*).

A. PES-PELECANI, Linn. Pl. 12, fig. 31.

Yellowish white to light brown. Length, 2 inches.

Seas of Europe, Iceland.

This is the *Cochlea pentadactylus* of Pliny, *Vespertilio spinosa* of Seba, and *R. quadrifidus*, Da Costa. Jeffreys says of it (Brit. Conch., iv, 251): "Habitat: Coralline zone (occasionally the deep-sea zone also) on all our coasts. This common shell has been recorded from the upper miocene, pliocene, and almost every newer tertiary and quaternary deposit in Europe, from the sea-level to 1360 feet above it. It is shy, slow, and awkward in its movements, twisting about its long neck and foot in order to gain a creeping posture. Among other fanciful names given to this odd-looking shell, are 'blobber-lipt Edinburgh whilk' of Petiver, 'aile de chauve-sauris femelle' or 'patte d'oye' of D'Avila, and 'Zamarugola' of the Venetians, by the poorer class of which people the animal was—perhaps is still—eaten. Ac-

cording to Mr. Couch, *Solaster papposus* also reckons it an agreeable kind of food; when the soft portion has been digested, the empty shell is rejected, and becomes the habitation of a Sipunculus, which narrows the too capacious entrance with agglutinated sand. Specimens from deep water are smaller than those from the coast. The top of old but living shells which had lost their upper story, is sometimes closed by a semispiral plug or septum of new shelly matter; the apex is very seldom perfect in full-grown specimens. When the outer lip is complete the subsequent growth takes place by adding fresh layers inside, so that the age of the individual is probably shown by the number of such layers. In immature specimens the commencement of the pterygoid or wing-like flap of the outer lip is defined by a bit of enamel along the mouth, which likewise lines the canal at the base as well as the upper process of the flap. Still younger specimens, before any sign of the flap appears, have the outer lip flexuous, with a wide and deep sinus at the upper part, and a long straight canal at the base. In this stage of growth they strongly resemble Fusi. The fry form a short cylinder. Monstrosities are not uncommon, especially in the shape and relative size of the digitated processes; the basal point, however, is always formed like a spear-head."

According to Mörch *Chiropteron semilunare* of Sars is probably the larval stage of Aporrhais.

A. Serresianus, Michaud. Pl. 12, fig. 32.

Whitish, or light yellowish brown. Differs from the preceding species by its long posterior and anterior canals, and by the outer lip being three-spined. Length, 2 inches.

Europe, from *Norway* to the *Mediterranean Sea*.

Perhaps more generally known under the name of *A. pes-carbonis*, Brong., which is, however, a wrong identification, the latter being a fossil and different species. Dr. Gwyn Jeffreys gave it the name of *A. Macandreæ*.

A. Senegalensis, Gray. (Unfigured.) *Senegal.*

The (insufficient) description indicates close affinity or identity with *A. pes-pelicani*.

Section II. Arrhoges, Gabb, 1868.

A. occidentalis, Beck. Pl. 12, fig. 33.

The longitudinal ribs of the spire, and absence of tuberculated angles on the whorls, as well as the entire but greatly expanded lip, will readily distinguish this species. Length, 2–2·5 inches.

Labrador, *Newfoundland.*

Subfamily Struthiolariinæ.

Genus STRUTHIOLARIA, Lam., 1812.

The synonymy of the few species of this New Zealandic genus was very much involved until 1876–7, when the Marchioness Paulucci (Bull. Soc. Mal. Ital., ii, iii), critically studied them and gave them essentially the nomenclature which follows.

Section I. Struthiolaria (*s. stricto*).

S. papulosa, Martyn. Pl. 12, fig. 34.

Whorls strongly nodose on the angle; yellowish brown, indistinctly longitudinally chestnut-striped. Length, 3 inches.

New Zealand.

This is *Murex stramineus*, Gmelin; *S. nodulosa*, Lam.; *S. papillosa*, Gray; *S. coronarium*, Soland.; *S. nodosa*, Gray.

S. vermis, Mart. Pl. 12, figs. 35, 36.

Shoulder obtuse, obsoletely nodose, suture somewhat excavated. Length, 1·75 inches.

New Zealand.

The synonyms are *S. australis*, Gmelin; *S. scutulata*, Hutton; *S. inermis*, Sowb.

Var. crenulata, Lam. Fig. 35.

The sutural channel deeper, the numerous nodules of the shoulder-angle small but more distinct. *S. canaliculata*, Speng., is a synonym.

S. gigas, Sowb. Pl. 12, figs. 37, 38.

Less sharply angled, the nodules smaller, the suture slightly channeled, the striæ alternately larger and smaller, the lip more solidly thickened than in *S. papulosa*. Very like a gigantic *S.*

vermis, and appearing to connect that species with *S. papulosa*. These three will probably prove to be varieties only of a single species.

New Zealand.

S. sulcata, Jonas (fig. 38) is simply an individual having the revolving sulci stronger than usual, with the shoulder and its nodules almost obsolete. Its locality, China. is, of course erroneous. The specific name has priority over *gigas*, but besides the fact that it has been overlooked by all the monographers, the specimen upon which the description is based, although recognizable as this species, is not normal in its characters.

Section II. Pelicaria, Gray, 1857.

S. scutulata, Martyn. Pl. 12, figs. 39, 40.

Yellowish fawn-color, longitudinally more or less streaked with a darker shade; sutures callous. Length, 1·5–2 inches.

New Zealand.

S. oblita, Sowb., is a synonym.

S. mirabilis, Smith. Pl. 12, fig. 41.

Shell thin, white, under a very thin, deciduous olivaceous white epidermis, spire and upper part of body-whorl sharply cancellate, on the lower part of the body-whorl the longitudinal ribs become obsolete. Length, 42 mill.

Kerguelen Islands.

Has the aspect of a Buccinum, but the operculum, animal, and the dentition especially, show it to be a true Struthiolaria. Kerguelen has representatives of other New Zealand genera, showing similar variation in being more fragile. *S. costulata*, von Martens, is a synonym; it was published only about three weeks after Mr. Smith's name.

S. microscopia, Gray. This is a species of Sinusigera.

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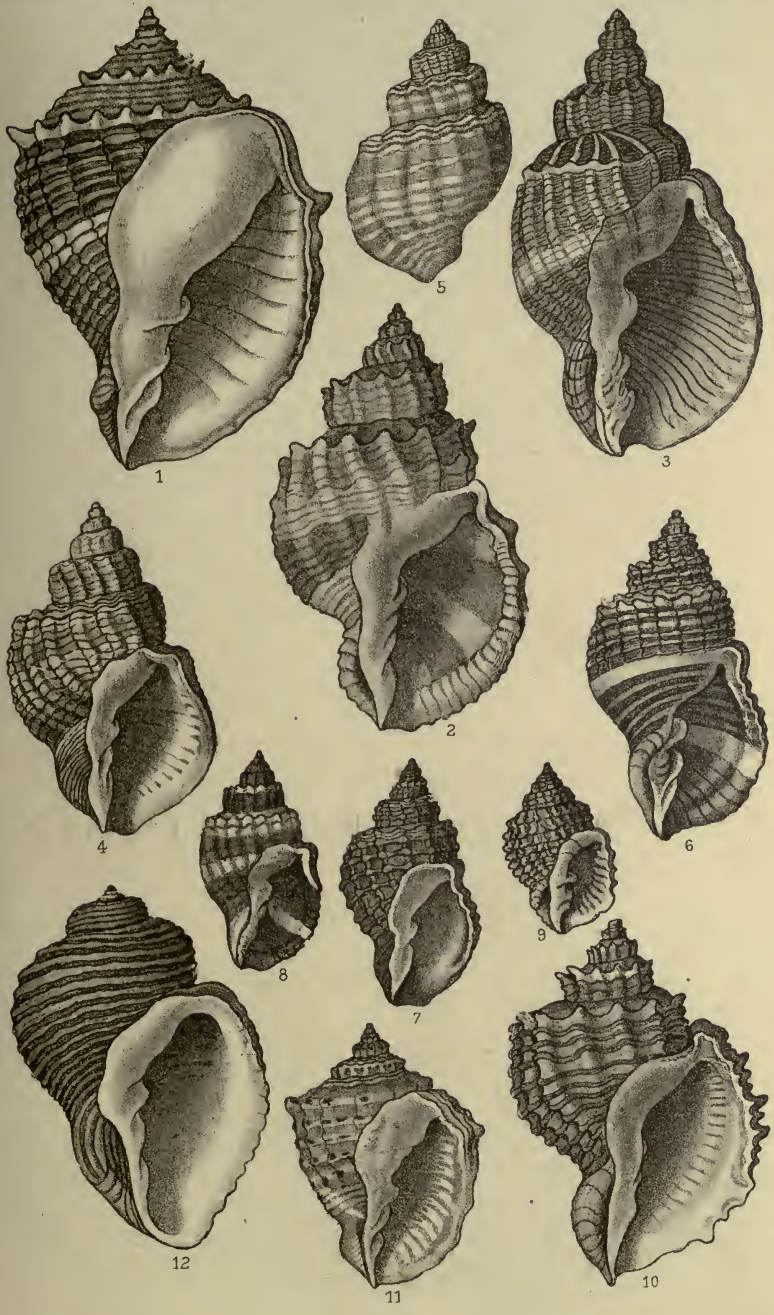
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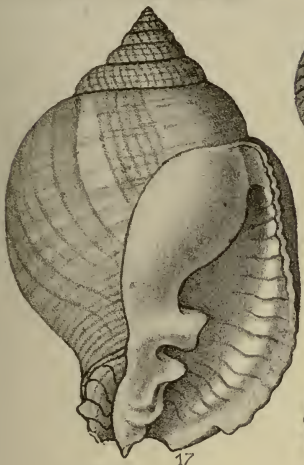
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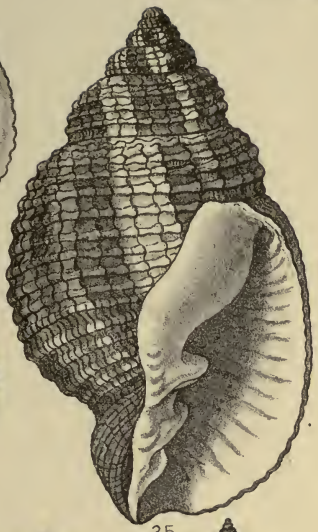
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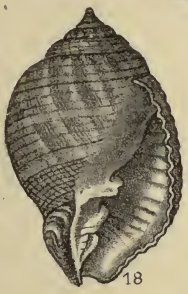
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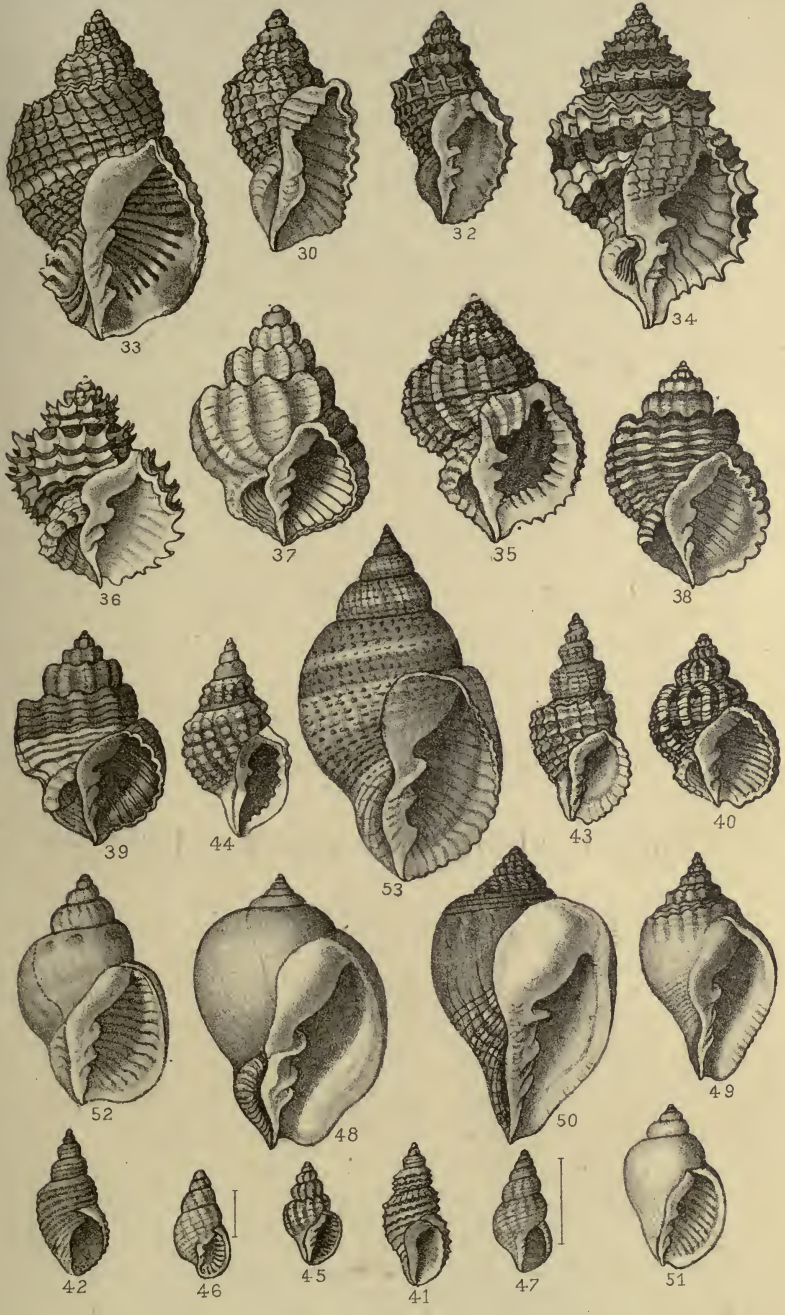
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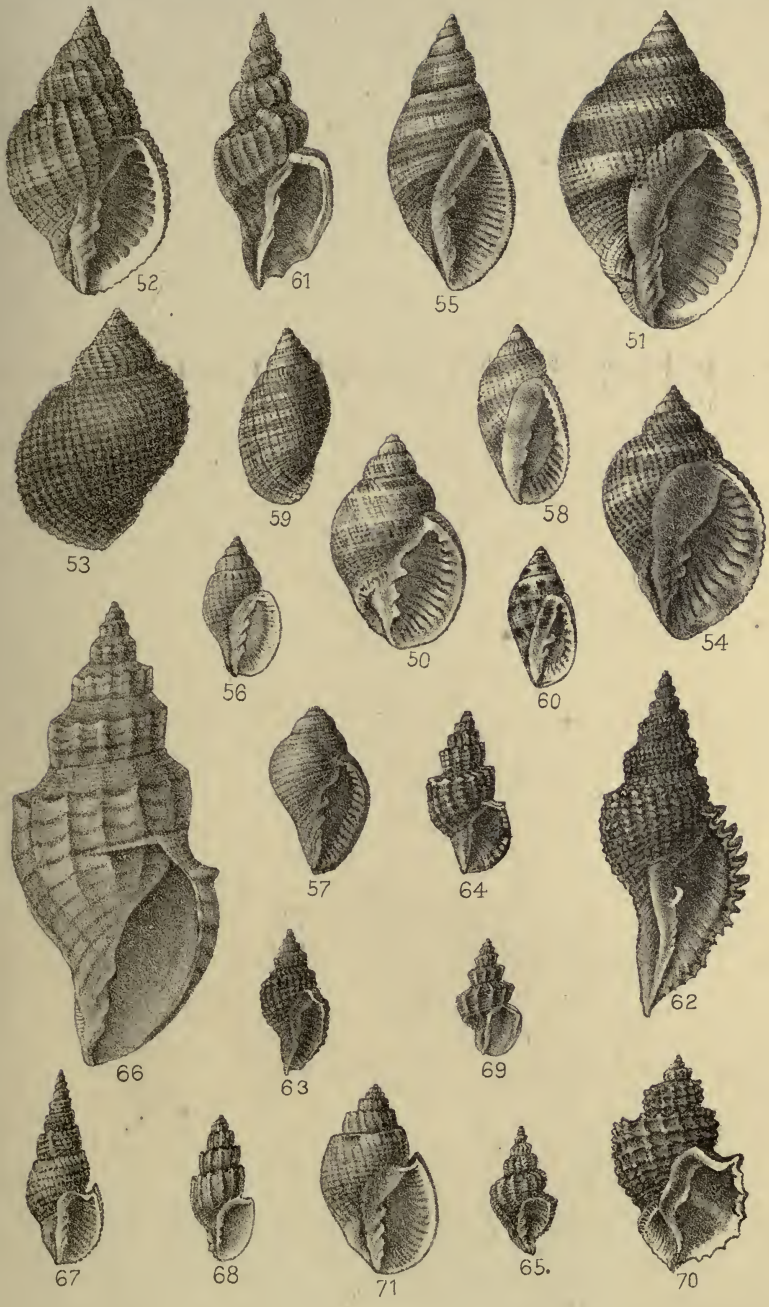
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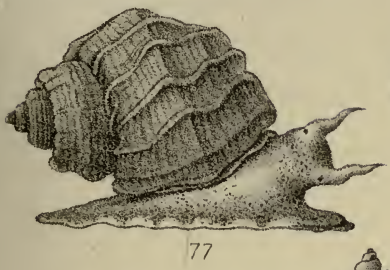
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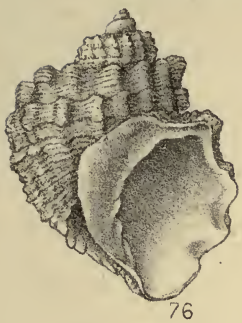
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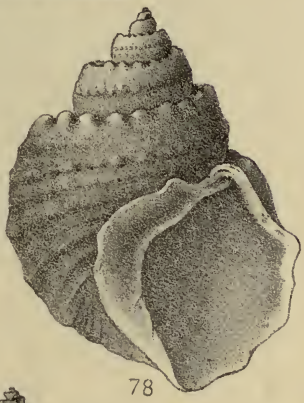
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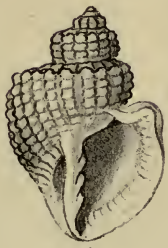
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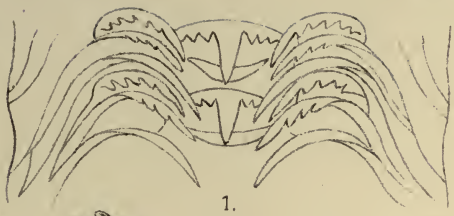

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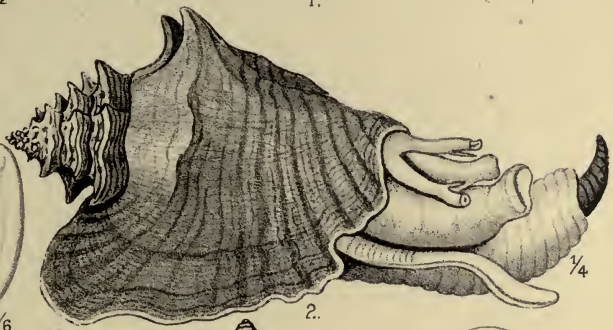

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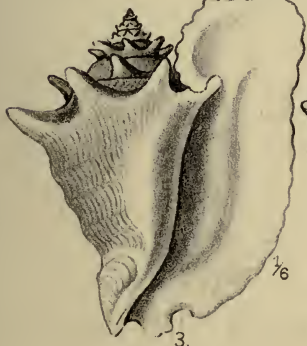

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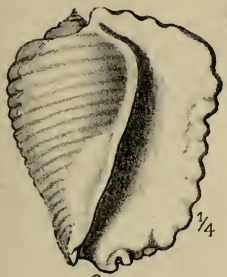

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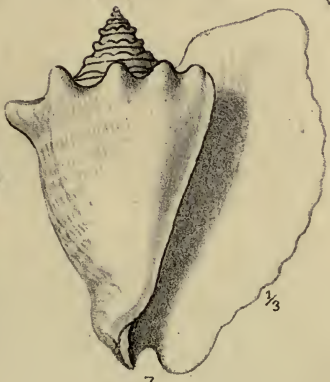

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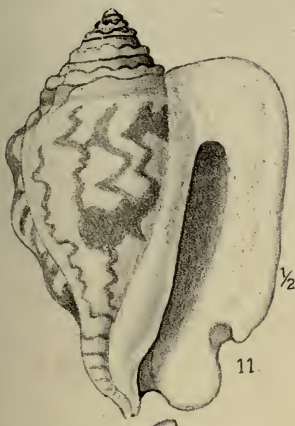

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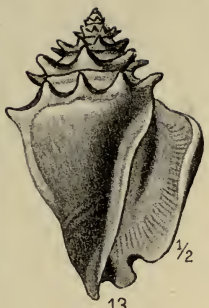

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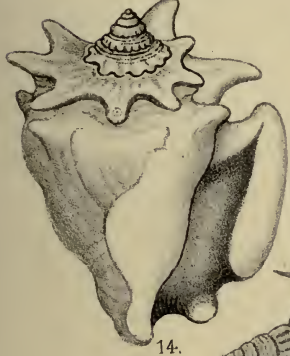

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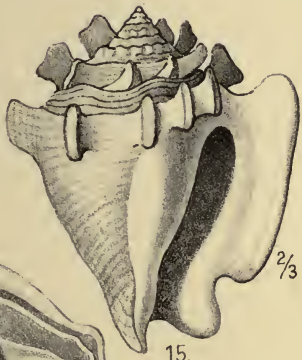

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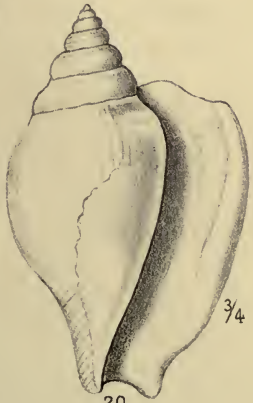

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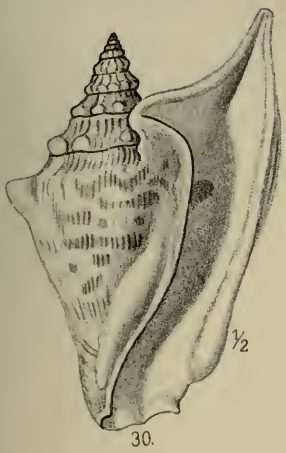

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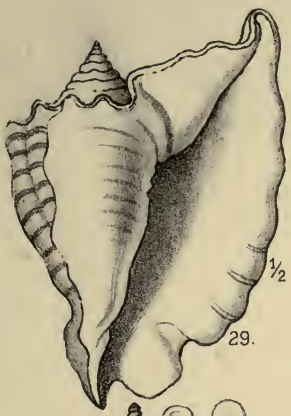

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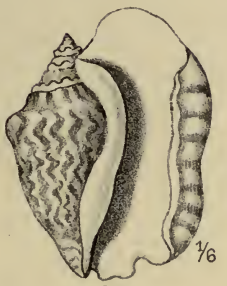

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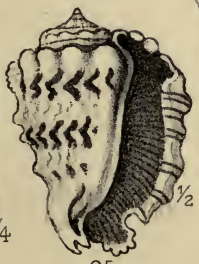

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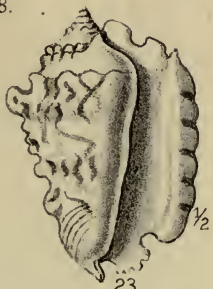

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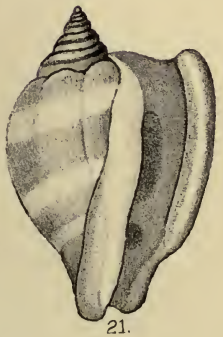
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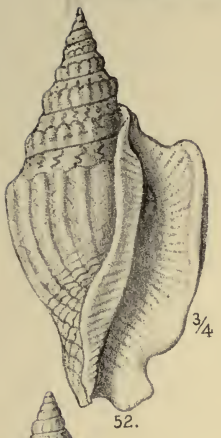
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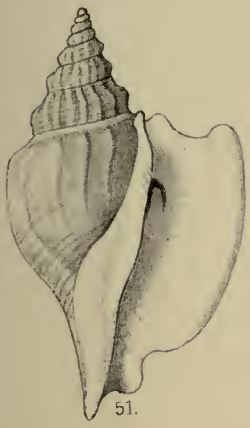
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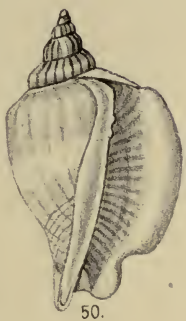
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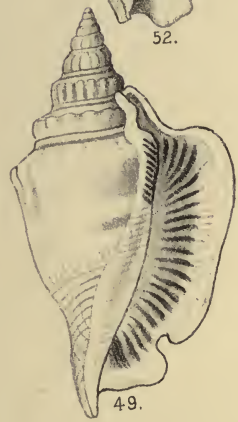
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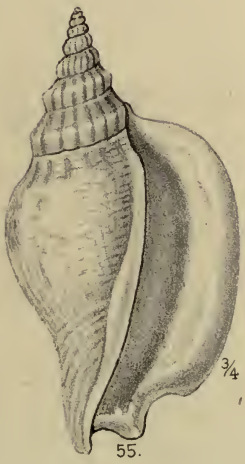
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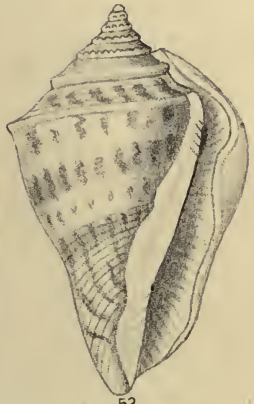
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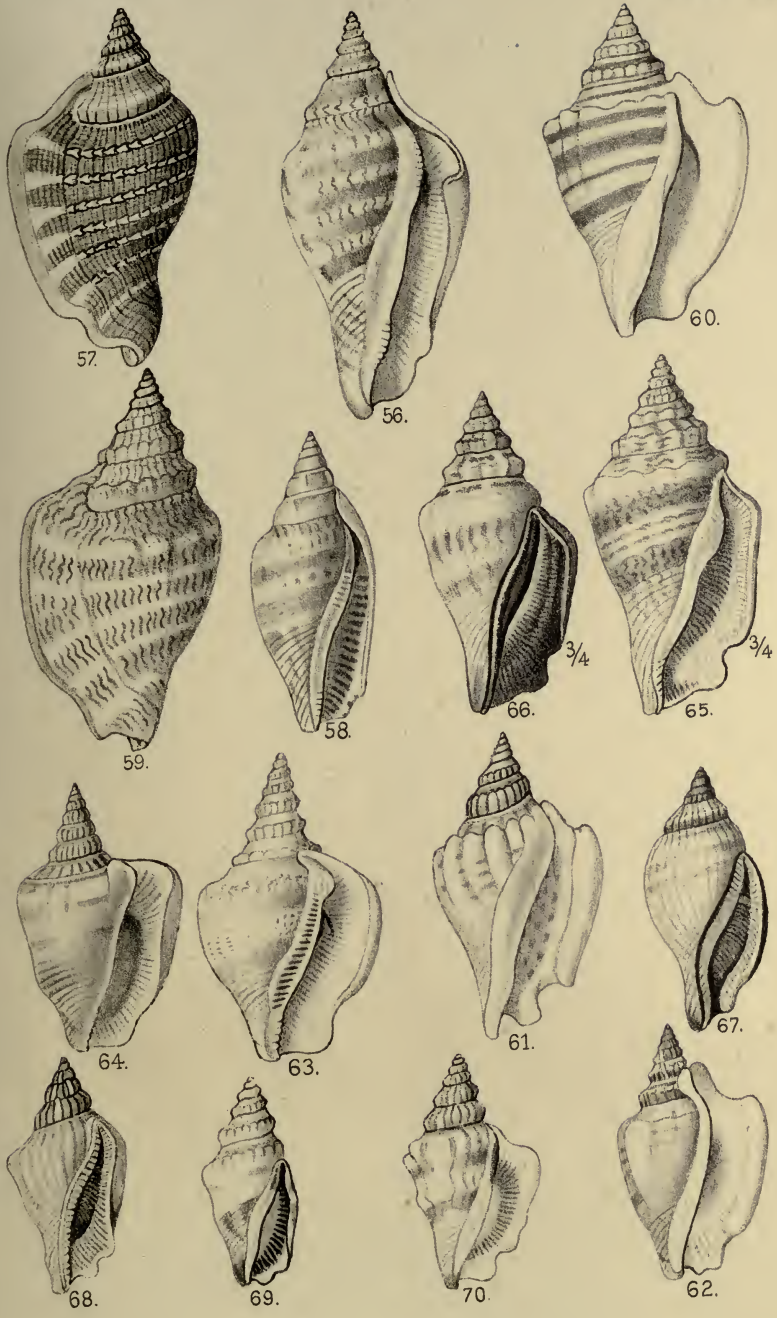
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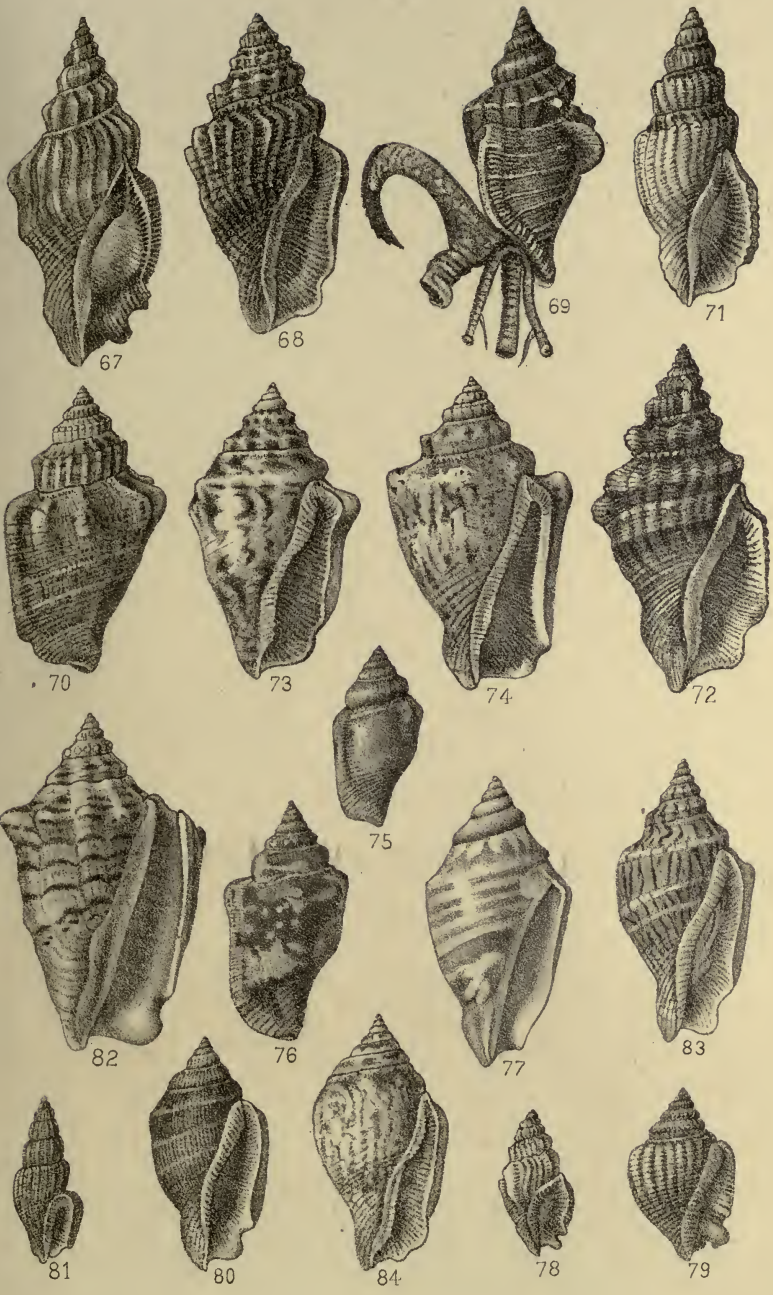
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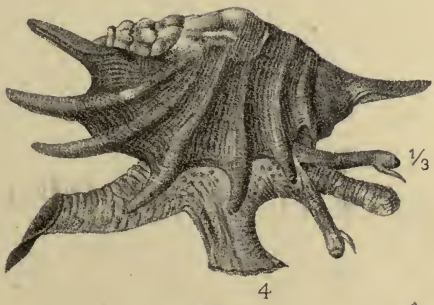
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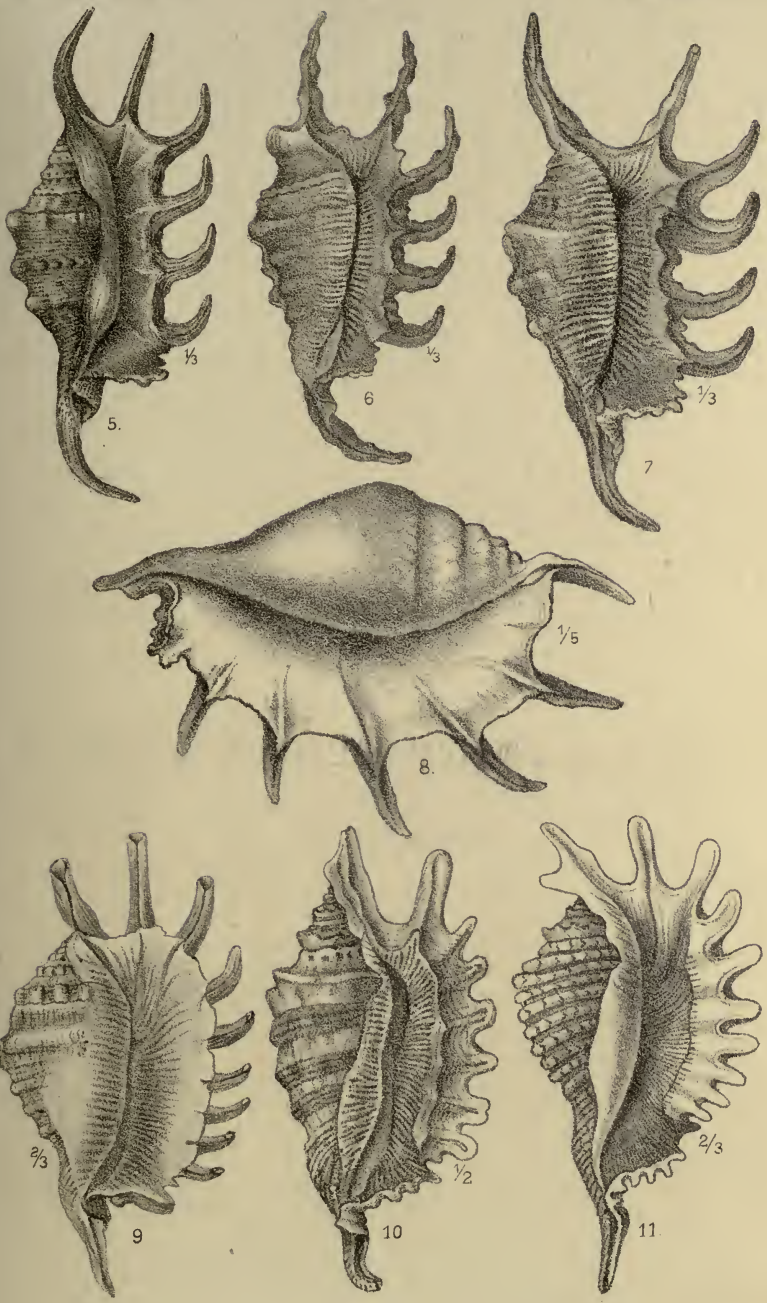
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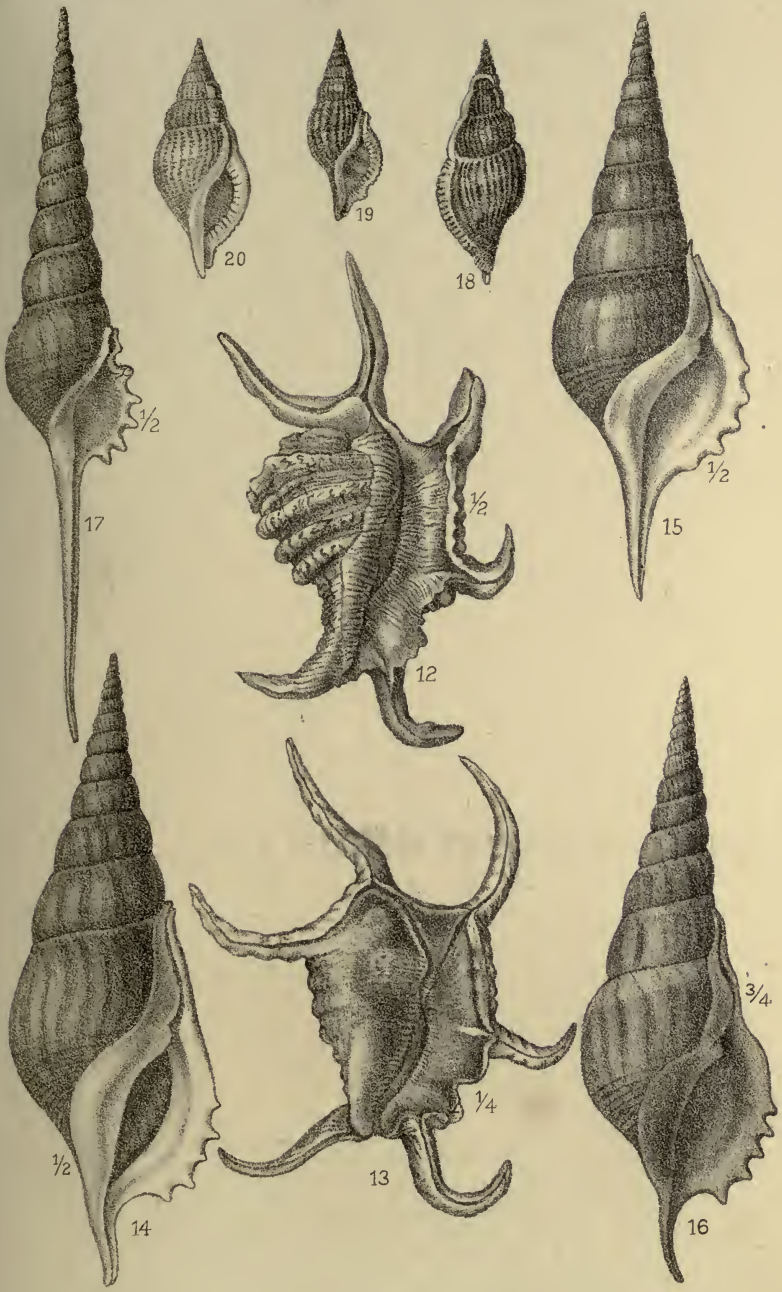
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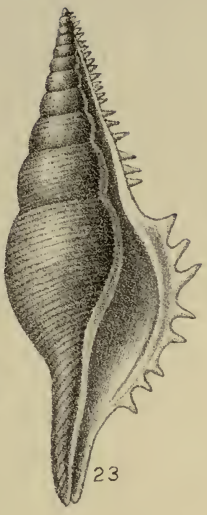
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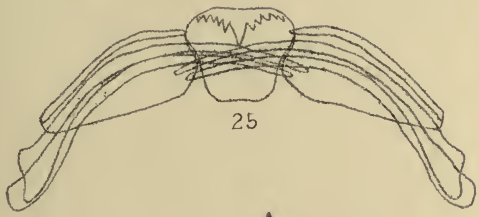
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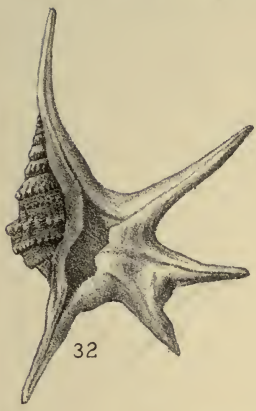
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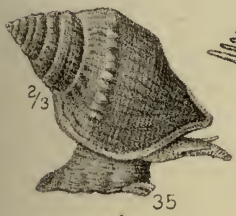
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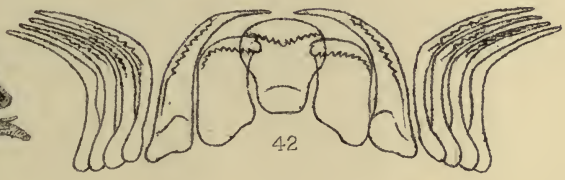
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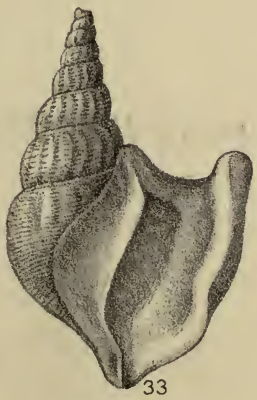
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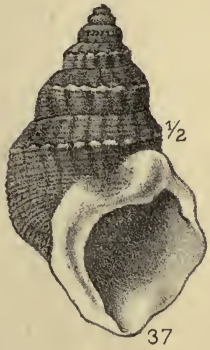
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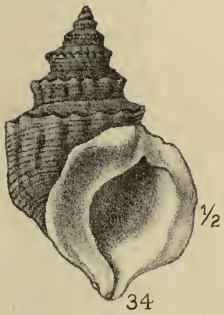
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MONOGRAPH OF THE FAMILY CYPRÆIDÆ.

Prepared expressly for the "Manual of Conchology,"

BY S. RAYMOND ROBERTS,

Member of the Conchological Section of the Academy of Natural Sciences of Philadelphia.

Family *CYPRÆIDÆ*.

(Cowries.)

Animal having tentacles usually long and stout, the eyes situated on a thickened portion about one-third the distance from the base; mantle produced into two lobes capable of covering the shell, and furnished with warts, or forked or pointed filaments, sometimes papillose as in Trivia.

Head obtuse, cylindrical; siphon broad, short, sometimes fringed at the edge or bordered with papillæ similar to those on the mantle; foot large, simple, oblong-ovate, in ample folds, more or less acuminated at the extremities, sometimes truncate in front; in Trivia it extends posteriorly far beyond the shell and terminates obtusely.

Color of mantle extremely variable; foot, head and siphon usually pale orange.

Individuals bisexual; male organ very large.

Lingual riband rather long, with seven series of teeth, arranged 3·1·3, each row being composed of one broad quadrate uncinated rachidian tooth flanked on each side by three hooked laterals (Pl. 15, fig. 8; Pl. 20, fig. 41). Jaw corneous (Pl. 20, fig. 64).

No operculum.

Shell ovate, varying from cylindrical to pyriform, sometimes ribbed or pustulate, but mostly smooth and possessing a high

polish and brilliant coloring; spire nearly, if not entirely, covered by the body-whorl which envelops it; aperture nearly central, narrow and longitudinal; lip and columella more or less toothed the entire length; occasionally, but rarely, without teeth.

The young shell differs in being Bulla-shaped; the columella is smooth, the outer lip thin, and the color diffused in bands or waved lines. As the animal grows, the lip and columella thicken, teeth begin to develop and the shell becomes more solid. The two unequal lobes of the mantle extend one from either side of the aperture, and meet upon the dorsal surface of the shell, producing at the point of contact what is known as the "dorsal line" or "sulcus." The function of the mantle is to deposit the calcareous substance which forms the richly colored enamel of the shell.

The cowries are shy and move slowly; they inhabit the warm seas of the tropics, though a few species occur farther north, notably *Trivia Europæa*, which has been found on the coast of Norway, and is abundant on the shores of Great Britain, ranging from the verge of low-water to as deep as fifty fathoms. The highest northern station on the west coast of America, at which any representation of the Cypræidæ has been detected, is Bodega Head, Cal., in lat. about 38° north (Stearns).

They feed largely upon coral animals. Those found on some of the islands near New South Wales are usually seen lying upon deep beds of dead shells of the genus *Pectunculus*. Fossil, the *Cypræidæ* commenced in the Cretaceous, and have augmented in the number of species to the present time. One species is reported from the Upper Jurassic of Sicily. From the fact that in many species of Cypræa small shells are found fully adult, while larger examples appear less matured, theories about casting or dissolving and renewing the shell at different periods of the animal's existence have been advanced by several eminent authorities. Bruguière first expressed this opinion. His belief was that the animal left its shell to form a new one, after the manner of crabs. Lamarck coincided with this view, but Deshayes doubted the ability of the animal to secrete a new shell complete in all parts, after it had reached an advanced condition of existence, and considered the difference in size was

due to local influences. In 1844 Lieut. J. B. Hankey, of the English Navy, in a letter to Lovell Reeve, stated that he *saw* the cowry dissolve its shell and in a short time secrete a thin layer of glutinous matter, which in a few days attained the consistency of shellac, its form being that of the *Cymba*. In consequence of this extreme fragility, he was not able to preserve any of the specimens.

Unfortunately this observer does not say anything regarding the interior structure of the renewed shell, neither has there been any new light thrown upon this important matter by later writers, and the only literature referring to the subject is that the substance of which is here given.

While the statement of Lieut. Hankey is strong evidence, and it is a recognized fact that the cowry, like many other mollusks, does dissolve away portions of the interior structure of its shell when more room is wanted, yet I am not prepared to fully accept his statement, but rather favor the views expressed by Deshayes and attribute the difference in size to local causes. Possibly the larger shells may be those of the female.

The cowries are generally the first to attract the attention of the amateur, mainly on account of their rich and brilliant coloring; and examples of the commoner species, principally *C. tigris*, manufactured into a great variety of articles, are to be found in many households. The natives of the Orient, especially those belonging to the South Pacific Islands, use them largely for personal adornment. In India they are used as trimmings to various trappings for elephants and horses. The *Cypræa moneta*, or money-cowry, sometimes called the "prop shell," passes current almost exclusively in some parts of Africa. For this purpose many tons have been shipped from the Indian Ocean, where the shell occurs abundantly. Mr. John C. Hertz has published a memoir in the "Transactions of the Geographical Society of Hamburg," on the use and diffusion of the cowry shell as a medium of exchange. His father dispatched a vessel to the Maldive Islands in 1844, for a cargo of cowries to be sold to merchants for use in the West African trade. Not finding as many shells there as they had anticipated, they completed their cargo with the larger and less valuable species of Zanzibar, where the cowries are burned into lime. Several cargoes of cowries were sent annually to Whydah and Lagos, where they

were exchanged with the slave-traders for the Spanish doubloons they received from the sale of slaves. The Hamburg ship-captains dispatched this money home from Cape Town. The cowry-trade continued to extend as the slave-trade flourished, till Brazil took measures to prevent the introduction of African slaves. Simultaneously with the extinction of the slave-trade began the introduction of palm-oil, and a new trade, in which that product took the place of the Spanish doubloons, that grew as the use of palm-oil was extended. It flourished greatly during the Crimean War, when the Black Sea tallow was excluded from the markets. With it also flourished the trade in cowries, which thus appears to be connected with so many historical events that, considered from that point of view, it may be regarded as in some sort a measure of historical development—a view which received another exemplification in 1852, when England blockaded the coast of Dahomey, and the trade in cowries was stopped. In 1845 the Sultan of Bornoo reformed his currency, and introduced Spanish doubloons in place of the cotton-cloth that had hitherto served as money, with cowries, at the rate of four thousand to the dollar, for small change. A large demand for cowries sprang up, and the trade in them was stimulated to such an excess that the market was glutted, and it afterward languished for several years. The present demand is quite lively. The cowry-shell is used as currency principally in the countries near the Niger, except in Ashantee, where gold-dust is the medium of exchange. North of Ashantee, gold-dust and the gera or cola-nut (*Sterculia acuminata*) are used with cowries, a load of sixty pounds of the nuts being considered equivalent in value to about fifteen thousand cowries. The shells have been used as a medium of exchange from a high antiquity. Marco Polo found them circulating in Yunnan in the thirteenth century; and they have been discovered in prehistoric graves in the Baltic countries. Dr. Ruschenberger, U. S. N., says they are not used as money in the Maldive Islands.

On the authority of Mr. P. L. Simmonds, in "The Commercial Products of the Sea," a young wife in Africa costs from 60,000 to 100,000 shells, while an ordinary one may be had for 20,000, valuing the shells at about 4000 to the dollar. It is also stated that a house built by an English gentleman, in Cuttack, was paid for in cowries, sixteen millions being used.

In order to give some idea of the prices paid for the rarer species of Cypræa, it is reliably stated that the second specimen of *C. umbilicata* sent home by the collector, Mr. Roland Gunn, of New South Wales, was sold for £30. Good specimens can now be had for about $2.50 each.

A specimen of *C. guttata*, of which the Philadelphia Academy of Natural Sciences possesses a fine example, was sold at auction a few years ago, and cost the purchaser £42. This species is still extremely rare. Other species range in price from $2.50 to $25.00 each: notwithstanding this, a good collection of the species can be obtained at a cost not exceeding $25.00.

A number of monographs and catalogues of the Cypræidæ have been published, the most important being the following:—

Gray. J. E.—Zoological Journal, 1824 to 1829. A monograph, including 113 species, some of which are figured.

Descriptive Catalogue of Shells, 1832, in which are enumerated and described 121 species.

Sowerby, G. B.—Conchological Illustrations, 1837. Colored figures of 143 species, a number of which are described.

Kiener, L. C.—Coquilles vivantes (no date). A monograph including 145 species with colored figures.

Reeve, Lovell.—Conchologia Iconica, 1845. Monograph with colored figures of 154 species.

Roberts, S. R.—Catalogue and Synonymy of Porcellanidæ. Amer. Jour. Conchology, v, 1869.

The species, 197 in all, are alphabetically arranged with the synonymy and bibliography fully indicated. The names proposed by authors prior to Linnæus, when binomial, are here recognized.

Sowerby, G. B., Jr.—Thesaurus Conchyliorum, 1870. Monograph, including 189 species, with colored figures.

Weinkauff, H. C.—In the Systematisches Conchilien-Cabinet of Küster, 1881, 185 species are described and figured, the notes added to some of the descriptions being often quite comprehensive. This author also enumerates the species, with par-

tial synonymy and bibliography in the "Jahrbücher der Deutschen Malakozoologischen Gesellschaft" for the same year.

According to Woodward, 97 fossil species have been determined.

The subdivision of the Cypræidæ into groups, is attended with considerable difficulty, inasmuch as many of the species which appear distinct when the types only of each are compared, are found to be closely connected by intermediate forms. For instance, take the series of shells of which *C. staphylæa* and *C. polita* are the extreme examples:

The former is dark in color, pustulate, and the teeth extend entirely over the base of the shell, in the form of ridges, while the latter is cream-tinted, perfectly smooth, the teeth being confined to the margin of the aperture except for a short distance at the extremities of the columella, and I do not hesitate to place it in the same group with the beautiful *C. Listeri*, Gray. Yet it is possible to connect them. The same may be said of many other well-recognized antipodal species. Again, local causes have produced variations in well-known species and these have received new names, thereby swelling the synonymy. This is noticeable in the case of the New Caledonian forms which frequently occur rostrate and show a tendency to melanism. Quite in contrast is this with the pale coloring exhibited in numerous Sandwich Islands specimens of other well-known species. It has been observed that the pale coloring peculiar to the shells from the latter locality, is confined to the *Cypræidæ*.

Of the New Caledonian forms, over forty species are found at Mauritius, and Dr. Jousseaume remarks as a consequence that this representation in so widely separated and completely isolated localities is not in accordance with the views of the advocates of geographical provinces.

Various classifications have been proposed, the most prominent being those of Gray, H. and A. Adams, Sowerby, Troschel, Weinkauff, and Jousseaume.

Dr. Gray recognized six genera: Cypræa, Luponia, Cypræovula, Trivia, Erato, Ovulum; subdividing the first into subgenera Cypræa, Aricia, Naria. His descriptions are as follows:

I. Cypræa.

Subgenus Cypræa—Front of columella broad, deeply impressed; shell mostly smooth.

Subgenus Aricia—Front of columella flat or nearly so, back of shell smooth.

Subgenus Naria—Front of columella narrow, dilated into a sharp toothed ridge; shell smooth.

II. Luponia—Shell like cowry, but front end of the columellar lip crossed by several irregular ridges without any distinct marginal one; internally narrow, flat, shell pear-shaped, smooth or ribbed.

III. Cypræovula—Like cowry, but front end of columella covered with regular cross-ribs like rest of base, internally produced into an acute toothed ridge, shell pear-shaped and ribbed.

IV. Trivia—Like Cypræovula, but front of columella internally concave, ribbed, shell subglobular, cross-ribbed.

(*Erato* and *Ovulum* are now excluded from this family.)

The Messrs. Adams modified these groups and added others, as follows:

Cypræa, representing the cylindrical forms, with Naria as a subgenus.

Aricia, shells with flattened base.

Luponia; Cypræovula; Trivia, with Pustularia as a subgenus for pustulate forms; and Epona.

Under this arrangement, *C. carneola* would be entitled to a place in Aricia as well as in Cypræa.

Sowerby in "Thesaurus Conchyliorum" makes two divisions:

A. Cypræa, proper. Columella ending in a lobe and plait.

B. Cypræa, subgenus Trivia. Columella without distinct lobe or plait.

He attempts to arrange the species in the order of their nearest allies.

Dr. Troschel named two families: Cypræacea, Triviacea, basing his subdivisions upon differences in dentition; but as these differences do not agree with those of the general characters of the shell, they need not be further considered. The first

family he subdivided into sections Cypræa, Aricia, Pustularia, and the last into Trivia and Erato. He further subdivided, Cypræa into Talparia, Tigris, Lyncina and Mauritia; and Aricia into Erronea, Erosaria and Monetaria. Erato having been monographed by Mr. Tryon with his "Marginellidæ," leaves but one section in the second family.

Weinkauff, in 1881, proposed seven divisions, viz.: Cypræa, Aricia, Luponia, Ocellaria, Pustularia, Epona, Cypræovula. He makes Trivia a subgenus and endeavors to show how these subdivisions run into each other. While this arrangement coincides somewhat with that of Messrs. Adams, the author makes the restriction that what are called genera and subgenera, with him are simply sections to which he has subjoined the Adams' names.

He very properly remarks that Pustularia is more nearly related to Cypræa than to Trivia; and follows Sowerby in separating Ocellaria, holding that the eye-markings and, still more, the impressions upon the sides of the shell are of sufficient consequence to allow this group a separate place.

In a study of the Cypræidæ, published in the "Bull. de Soc. Zool. France," for 1884, Dr. F. Jousseaume proposes to subdivide the family into thirty-six generic groups, twenty-five of which are new to science, the remaining eleven being adaptations of those of previous authors, as follows:—

Bernaya, Jouss. (Fossil). Type *B.* (*Cyp.*) *media*, Desh.

Gisortia, Jouss. Types *G.* (*Ovula*) *gisortiana*, Val.; *G.* (*Cyp.*) *mus*, Linn.

Mandolina, Bayle MSS. (Fossil). Type *M.* (*Cyp.*) *gibbosa*, Borson.

Zoila, Jouss. Type *Z.* (*Cyp.*) *Scotti*, Brod.

Mauxiena, Jouss. Type *M.* (*Cyp.*) *Mauritiana*, Linn.

Trona, Jouss. Type *T.* (*Cyp.*) *stercoraria*, Linn.

Umbilia, Jouss. Type *U.* (*Cyp.*) *umbilicata*, Sowb.

Vulgusella, Jouss. Type *V.* (*Cyp.*) *tigris*, Linn. *C. lynx*, Linn., is here included.

Arabica, Jouss. Type *A.* (*Cyp.*) *Arabica*, Linn.

Cypræa, Linn. Type *Cyp. cervus*, Linn.

Porcellana, Klein. Type *P.* (*Cyp.*) *argus*, Linn.
Luria, Jouss. Type *L.* (*Cyp.*) *lurida*, Linn.
Luponia, Gray. Type *L.* (*Cyp.*) *Algoensis*, Gray.
Cypræovula, Gray. Type *C. Capensis*, Gray.
Zonaria, Jouss. Type *Z.* (*Cyp.*) *zonata*, Chem.
Adusta, Jouss. Type *A.* (*Cyp.*) *adusta*, Chem. = *C. onyx*, Linn.
Erronea, Troschel. Type *E.* (*Cyp.*) *errones*, Linn.
Stolida, Jouss. Type *S.* (*Cyp.*) *stolida*, Linn.
Cribraria, Jouss. Type *C.* (*Cyp.*) *cribaria*, Linn.
Naria, Gray. Type *N.* (*Cyp.*) *irrorata*, Sol.
Basterotia, Bayle MSS. (Fossil). Type *B.* (*Cyp.*) *leporina*, Lam.
Ponda, Jouss. Type *P.* (*Cyp.*) *achatina*, Sol. = *ventriculus*, Lam.
Monetaria, Troschel. Type *M.* (*Cyp.*) *moneta*, Linn.
Erosaria, Troschel. Type *E.* (*Cyp.*) *erosa*, Linn.
Staphylœa, Jouss. Type *S.* (*Cyp.*) *staphylœa*, Linn.
Tessellata, Jouss. Type *T.* (*Cyp.*), *tessellata*, Swn.
Ipsa, Jouss. Type *I.* (*Cyp.*) *Childreni*, Gray.
Cyprædia Swainson (Fossil). Types *C.* (*Cyp.*) *cancellata*, Swn.; *C. Adamsoni*, Gray.
Pustularia, Swainson. Type *P.* (*Cyp.*) *cicercula*, Linn.
Nuclearia, Jouss. Type *N.* (*Cyp.*) *nucleus*, Linn.
Jenneria, Jouss. Type *J.* (*Cyp.*) *pustulata*, Lam.
Pustula, Jouss. Type *P.* (*Cyp.*) *radians*, Lam.
Triviella, Jouss. Type *T.* (*Cyp.*) *oniscus*, Lam.
Trivia, Gray. Type *T. Europæa*. Mont.
Niveria, Jouss. Type *N.* (*Trivia*) *nivea*, Gray.
Trivirostra, Jouss. Type *T.* (*Trivia*) *scabriuscula*, Gray = *T. oryza*, Lam.

No objection can be raised to any plan of grouping that will aid the student in his study of this family, but when it comes to giving each group a title, as has been done in this instance, there is an unnecessary swelling of the already too large list of generic names.

In my catalogue, published in 1869, I followed the Messrs. Adams, with the addition of the genus Gaskoinia, proposed by

me for a group of shells of which the *Cyp. edentula*, Gray, is the only example at present known.

With regard to Erato, although its animal possesses much in common with that of Trivia, particularly in the dentition (if correctly figured), yet I agree with Mr. Tryon that "the balance of characters seems to indicate a rather closer relationship" with Marginella, where he has placed it. At any rate, the genus is already monographed in this work, vol. v, p. 7.

Besides these, the following fossil genera have been established: Cyprærorbis and Sulcocypræa, named by Conrad, but not described, and Cyprædia, Swainson. Pseudocassis, Pictet, erroneously referred as a synonym to Gaskoinia, Roberts, in Tryon's Structural and Systematic Conchology, scarcely belongs to the family.

The following arrangement is suggested after careful study as being that best attainable by me, but on account of the great variability of form and other characters, I am convinced that no scheme of classification can be presented that will positively determine the position of all the species. In using the subgeneric terms here given, I do not recognize in them any systematic value except in the case of Trivia, which is sufficiently well characterized to entitle it to the position of a subgenus.

Genus CYPRÆA, Linn.

Section I. Shell cylindrical, or nearly so.
Group A. Not margined.
* Spotted, teeth brown-tinted.
** Not spotted, teeth whitish.
Group B. Margined.
* Margins not spotted.
** Margins spotted, teeth small.
Section II. (Aricia, Gray, pars.)
Shell ovate, thick, margined with flattened base.
Group A. Shell smooth.
* Not spotted.
** Dorsal surface spotted.
*** Spots extending over the base.
Group B. Shell sometimes nodose or tuberculated.

Section III. (Luponia, Gray, pars.)
Shell pyriform or pyriformly ovate, usually spotted.
Group A. Shell smooth, not margined.
* More or less ventricose or inflated.
** More or less oblong or sub-pyriform.
Group B. Shell smooth, margined.
* Margins not pitted.
** Margins more or less pitted, dorsal spots usually ocellated.
Group C. (Gaskoinia, Roberts.) Shell smooth, edentulate.
Group D. (Cypræovula, Gray.) Shell ribbed transversely.
Group E. (Pustularia, Swn.) Shell pustulate or nodulous.
Section IV. (Epona, H. and A. Adams.)
Shell globose, back either smooth or with elevated tubercles, extremities produced.

Subgenus Trivia, Gray.

Shell subglobular, cross-ribbed, front of columella internally concave, ribbed.
Group A. Shell generally thin, aperture wide, outer lip narrow, margined.
Group B. Shell thick, usually margined, aperture narrow and more or less central.
a. Having a dorsal impression.
* Shell white.
** Shell usually pinkish, spotted.
*** Shell brownish.
b. Having no dorsal impression.
* Shell white.
** Shell pinkish, sometimes spotted.
*** Shell brown.

The material of this monograph has been prepared under some disadvantages, during the few odd hours of leisure occurring in an active mercantile life; this will explain, if it does not excuse its errors and omissions. The author takes this opportunity to acknowledge valuable aid rendered by a number of conchological friends at home and abroad, while prosecuting this labor of love.

Genus CYPRÆA, Linn.

Section I. *Shell cylindrical or nearly so.*

Group A. Not margined.

* *Spotted, teeth brown-tinted.*

C. ARGUS, Linn. Pl. 1, figs. 1, 2.

Pale brown, back three-banded, covered with numerous brown rings, base ornamented with four large dark chestnut spots, two on each side of the aperture. Length, 2·5–4 inches.

Indian Ocean, New Caledonia, New Hebrides.

C. CERVUS, Linn. Pl. 2, figs. 11, 12.

Shell more or less inflated; brown, ornamented with numerous somewhat small white spots, base usually dark brown.

Length, 2–6 inches.

Panama.

Reported from the West Indies as well as the west coast of America, by several authors, but the true locality seems still in doubt. Prof. Mörch, while including it in his West Indian Cypræas, says he has seen no specimen with authentic locality.

The young *cervus* is transversely radiated with four bluish lead-colored bands.

C. EXANTHEMA, Linn. Pl. 1, figs. 3, 4, 5; Pl. 2, figs. 13, 14.

Differs from the preceding in being less inflated, more elongate and solid. It is of heavier growth, the spots are usually larger and are ringed. Length, 3–4 inches.

West Indies, Florida; Panama to *Mazatlan* (var. *cervinetta*).

One specimen of this shell was found at Fort Macon, N. Carolina. Previous monographers have generally given this species an East Indian habitat; it is decidedly West Indian, while *C. cervus* probably belongs to the West Coast of America. This view coincides with that of Prof. Mörch.

C. cervinetta, Kiener (figs. 3, 13, 14) is a small variety, more cylindrical and of a deeper hue, the teeth on the columella are also of a richer dark brown. It belongs to the Panama and Mazatlan regions, and appears to be the West Coast representative of *C. exanthema*.

C. SCURRA, Chemn. Pl. 2, figs. 19, 20, 21.

Ashy blue, obscurely banded, and covered with an open network of brown, sides brownish, sprinkled with smoky black spots; teeth fine, aperture narrow. Length, 1·25–2 inches.

Annaa I.; Australia.

C. TESTUDINARIA, Linn. Pl. 1, figs. 9, 10.

Milky brown, back clouded and spotted with fulvous and chestnut-brown, and profusely sprinkled with minute white scurf-like specks, base flesh-colored, teeth white.

Length, 4–6 inches.

Ceylon; New Caledonia (rare).

In the young shell there are several bands of interrupted chestnut-brown blotches, more or less obscure; they begin to change in the second stage of growth, and disappear entirely in the third.

** *Not spotted, teeth whitish.*

C. ISABELLA, Linn. Pl. 1, figs. 6, 7.

Ashy fulvous, obscurely three-banded, marked longitudinally with inky black dashes, extremities saffron-red, base white, teeth very fine and numerous. Length, ·75–1·5 inches.

Indian and Pacific Oceans.

C. controversa, Gray, first described as a species, was afterwards identified by its author as a variety of *Isabella.*

C. LURIDA, Linn. Pl. 3, figs. 22, 23.

Bluish olive, obscurely banded, base whitish, extremities stained on each side with a rich blackish-brown blotch.

Length, 1–2 inches.

Mediterranean Sea.

Fossil in the conglomerate of Santiago, C. Verd.

C. PULCHRA, Gray. Pl. 2, figs. 17, 18.

Differs from the above in having a narrower aperture and much smaller teeth, which are nearly obsolete and tinted brownish, the base is ruddy olive. Length, about 2 inches.

Red Sea.

This species was first called *pulchella* by Dr. Gray, but on finding the name preoccupied, he changed it to *pulchra.*

C. CINEREA, Gmel. Pl. 2, figs. 15, 16.

Ash-brown, sometimes longitudinally painted with jet-black dashes, sides flesh-tinged and similarly painted, base cream-white, interstices between the teeth generally pinkish flesh-color.

Length, 1–1·75 inches.

West Indies.

Fossil, common in the Pliocene clay beds of Costa Rica (W. M. Gabb).

C. CLARA, Gask. Pl. 1, fig. 8.

Very closely allied to, if not identical with the above. The main difference lies in the teeth, which are smaller.

Length, about $1\frac{1}{4}$ inches.

Hab.?

C. REEVEI, Gray. Pl. 3, figs. 24, 25.

Differs from *C. cinerea*, Gmel., in being bluish lavender in color, with the extremities delicately tinted pink. The shells usually present an undeveloped appearance.

Length, about 1·5 inches.

Swan R., Australia.

Group B. Margined.

* *Margins not spotted.*

C. CARNEOLA, Linn. Pl. 3, figs. 26–30.

Pale flesh-color, ornamented with four, occasionally five, bands of a deeper tint; base and sides pale fulvous; teeth and interstices deep purple. Animal red. Length, 1–3 inches.

Pacific and Indian Oceans.

This species is extremely variable both in size and shape, and some specimens are quite like the group in which the *C. arenosa* has been placed. Mr. Sowerby, in Thes. Conch. Cypræidæ, calls attention to a variety in which the teeth are not purple-tinted. This is probably the *C. Loebbeckeana* of Weinkauff (figs. 29, 30), but Weinkauff says of his species, that in addition to this, there is also the absence of the bands of color on the back, whilst Sowerby's figure indicates their presence. Very large specimens of *C. carneola*, from the Isle of Pines, have been confounded by non-scientific collectors with *C. aurantium*, Martyn.

Fossil, the species is common in the clay beds of Costa Rica (Gabb).

C. TALPA, Linn. Pl. 3, figs. 31–33.

Pale yellow, obscurely two- or three-banded, extremities, sides and base blackish brown; interstices of the teeth whitish. The animal is black. Length, 2–3 inches.

Pacific and Indian Oceans.

The young shell is entirely yellow, with brown-tinged bands; the rich basal coating of dark enamel is the last deposit in its formation.

C. EXUSTA, Sowb. Pl. 3, figs. 34, 35.

Differs from the preceding in being more pyriform, the teeth are finer and merely marginal in the outer lip. Its aperture is also much narrower. Length, 2–3 inches.

Red Sea.

C. INTERRUPTA, Gray. Pl. 3, figs. 36, 37; Pl. 4, figs. 38, 39.

Shell slightly umbilicated, back freckled with olive-green, and ornamented with three bands of square dark olive spots, sides and base white, teeth small. Length, ·5–·75 inch.

Ceylon.

C. rhinoceros, Souv. (Pl. 4, figs. 38, 39), is an abnormal variety from New Caledonia, in which there is a callous swelling of the anterior terminal deposit.

C. QUADRIMACULATA, Gray. Pl. 4, figs. 40, 41, 42.

Attenuately beaked at each end, back minutely freckled with olive-brown, extremities ornamented with a blackish-brown spot on each side, base white. Length, about ·75 inch.

Borneo, Indian Ocean.

C. pallidula, Gask. (fig. 42), is a small variety without the spotted beaks.

** *Margins spotted, teeth small.*

C. IRRORATA, Sol. Pl. 4, figs. 50, 51.

Pale purplish blue, obscurely banded, copiously sprinkled with fulvous-brown spots which are darker in color at the sides, extremities sometimes spotted light brown.

Length, about ·5 inch.

Elizabeth I., Paumotus.

C. Goodalli, Gray. Pl. 4, figs. 43, 44.

Delicate snowy white, conspicuously stained with a large, irregular orange-brown blotch. Length, ·5 inch.

Lord Hood's I., Paumotus.

C. fuscomaculata, Pease. Pl. 20, fig. 47.

Differs from the preceding in having the extremities painted with a large conspicuous dark chestnut-brown spot on each side. These are never absent even in specimens most weathered.

Length, ·37–·5 inch.

I. Apaian.

C. Adelinæ, Roberts. Pl. 4, figs. 46, 47.

More depressed than *C. Goodalli*, and the canary-colored base is more flattened, back bluish. The marginal spots extend somewhat over the base. Length, ·5 inch.

Hab.?

This shell was described and figured by Sowerby in Thes. Conch. as *C. fuscomaculata*, Gray MSS. Pease having preoccupied the name, I have changed it as above.

This species seems to be the connecting link between *C. Goodalli*, and *C. contaminata*.

C. contaminata, Gray. Pl. 4, figs. 48, 49.

Pale purple, ornamented with a large chestnut blotch, base orange, a few of the marginal spots extend over the base.

Length, ·5–·6 inch.

Indian and Pacific Oceans.

C. fimbriata, Gmel. Pl. 5, figs. 76–78.

Pale slate-color, minutely freckled with olive-brown, and ornamented with a brown central band which sometimes appears double, and at other times as an indistinct blotch; extremities conspicuously stained with violet, the marginal spots are not numerous and extend somewhat over the base, which is whitish.

Length, ·5–1 inch.

Indian Ocean, Australia, Paumotus.

A species which is extremely variable in size, but always distinguishable by the violet painting of the extremities. The young shell is dull pink and the central band is more marked.

C. MICRODON, Gray. Pl. 5, figs. 74, 75.

Resembles somewhat the small varieties of *C. fimbriata*. It is however, narrower and the teeth are very minute. The back is three-banded, the bands being composed of waved orange-brown lines. Length, ·4 inch.

Loyalty I., New Caledonia, Philippines, Mauritius.

C. MACULA, Adams. Pl. 4, figs. 71, 72.

Shell more pyriform than *C. fimbriata*, the teeth are coarser, the marginal spots are uniformly larger, and the painting of the extremities is brownish purple, even in small and worn specimens. It is closely allied to the larger forms of *C. fimbriata*.

Length, ·6–·9 inch.

Japan, Australia.

C. FELINA, Gmel. Pl. 4, figs. 52–55, 59, 60.

Greenish blue, freckled all over with olive, sides and base yellowish, spots on the sides large and black, teeth strong.

Length, ·5–·75 inch. *Indian and Pacific Oceans.*

Var. "*a*," *C. ursellus*, Gmel. (figs. 54, 55), is smaller, the base is whitish and more flattened.

Var. "*b*," *C. fabula*, Kiener (figs. 59, 60), shell shortened, gibbous, back elevated.

The animal of *C. felina* is pale, black-dotted.

C. HIRUNDO, Linn. Pl. 4, figs. 56, 57.

The olive freckles of the preceding are here supplanted by minute brown dots, and the extremities are painted with blackish-brown spots; base white, teeth conspicuous.

Length, ·6–·8 inch. *New Caledonia, Australia, Indian O.*

C. OWENI, Sowb. Pl. 4, figs, 45, 58, 68–70; Pl. 5, fig. 73.

Shell generally broader, and more margined than *C. hirundo*, marginal dots more numerous; the teeth are smaller and extend more over the base of the shell.

From a careful comparison of specimens of this shell with those of *C. Menkeana*, Desh. (Pl. 4, figs. 69, 70, from Deshayes; Pl. 4, fig. 58; Pl. 5, fig. 73, from Sowerby), both of which were received from Mr. Sowerby, I do not hesitate to place the latter as a synonym. The only noticeable difference is in the marginal dots, which in *Menkeana* sometimes run together,

giving a solid brown appearance. Specimens of *C. Oweni*, received from Mr. J. F. Bailey, of Melbourne, Victoria, are rather elongate, yellowish, and have a faded appearance, but decorticated shells are fawn-color.

C. NEGLECTA, Sowb. Pl. 4, figs. 61, 62, 63, 66, 67.

Differs from *C. hirundo*, in the teeth, which are smaller, more numerous, and extend over the base of the shell. The back is usually ornamented with a brown blotch.

Length, ·5–·75 inch. *Australia*, *Mauritius*.

C. coffea, Sowb. (figs. 66, 67) is a small variety, the teeth of which continue over the dorsal margin of the posterior extremity.

C. CYLINDRICA, Born. Pl. 5, figs. 79, 80, 81.

Bluish, freckled with minute fulvous-chestnut specks, and a large misshapen central blotch; extremities painted on each side with a conspicuous blackish-chestnut spot; the marginal dots are very few in number, and are confined to the left side; aperture anteriorly dilated, outer teeth large, inner fine, and elongated partially across the base; teeth and base whitish.

Length, 1·2–1·5 inches.

Ceylon, *Australia*, *New Caledonia*.

C. subcylindrica, Sowb. (fig. 81), is a more ovate variety, with teeth less strong, those on the columella being confined to its margin; the marginal dots are nearly obsolete.

C. TABESCENS, Sol. Pl. 5, figs. 82, 83, 84.

Whitish, freckled with pale yellowish brown, three-banded with semilunar spots of a little deeper shade. Spire depressed, teeth and base whitish. Length, ·7–1·5 inches.

New Caledonia, *Loyalty Is.*, *Australia*.

C. TERES, Gmel. Pl. 5, figs. 86, 87.

The gradation is fine from the more slender forms of *C. tabescens* to this species, but the more sudden bend of the aperture, more produced extremities and the increased number of teeth are sufficient to distinguish it. Length, ·75–·9 inch.

Ceylon.

Weinkauff, believing that the *C. tabescens* of authors is the true *C. teres*, Gmel., has named this species *C. subteres*.

C. CAURICA, Linn. Pl. 5, figs. 88, 89, 90.

Whitish, mottled with minute yellowish-brown specks, sides whitish to pale orange, ornamented here and there with dark conspicuous spots, base orange tinged with gray, teeth very strong, whitish, extending partially over the base on each side. Length, ·9–1·8 inches.

Indian and Pacific Oceans.

A most abundant species, varying from long and rounded forms, with thin sides, to those short and depressed, with thickened sides. The dorsal surface is frequently ornamented with a reddish-brown spot. A blackish-brown variety from New Caledonia is the *C. obscura*, Rossiter.

C. CRUENTA, Gmel. Pl. 6, fig. 97.

Differs from the preceding in the delicate dorsal coloring, which is interrupted by more or less distinct white spots of unequal size; the side spots are purple and the interstices of the teeth bright red; the teeth on the columella are usually confined more to the margin of the aperture. Length, ·8–1·8 inches.

Indian Ocean, N. S. Wales.

C. STOLIDA, Linn. Pl. 5, figs. 91, 92, 85; Pl. 6, fig. 7.

Bluish, painted with minute chestnut dots, with a large brown central square spot connected with half-square spots of the same color at each corner, base paler blue, teeth and extremities dark orange, the teeth extend somewhat over the base, marginal dots very small. Length, 1·1–1·5 inches.

Ceylon, Borneo, Sandwich Is. (?), *N. Caledonia.*

C. brevidentata, Sowb. (fig. 85), is a variety in which the teeth are short, rounded and fewer in number; they are confined to the margin of the aperture, and are not tinted; the dorsal appearance is like incompletely colored specimens of *stolida*.

C. Crossei, Marie (Pl. 6, fig. 7), is another variety in which the extremities are greatly produced and curve upward, the central spot of the typical *stolida* is here extended into a band and the whole shell has the distorted appearance so peculiar to many of the species from New Caledonia. The teeth are large, white and extend over the base of the shell.

C. ERYTHRÆENSIS, Beck. Pl. 5, figs. 93, 94.

Differs from *C. stolida* in the absence of the four corner lateral spots, the colorless teeth, the narrower and more tapering form, and the uniform smallness of the shell.

Length, ·65–·85 inch.

Red Sea.

C. CHRYSALIS, Kien. Pl. 4, figs. 64, 65.

Canary, obscurely banded, with extremities tinted deep orange, teeth very fine; no spots or other markings on the shell. Length, ·65 inch.

Habitat?

Believed to be the young form of some other species. I do not know this species, nor can I get any further information than that derived from Kiener.

Section II. (*Aricia, Gray, pars*) *Shell ovate, thick, margined, with flattened base.*

Group A. Shell smooth.

* *Not spotted.*

C. VENTRICULUS, Lam. Pl. 6, figs. 95, 96.

Shell rather angulated, back bluish white, ornamented with four carnelian bands, sides dark chestnut, tinged above with red, smoky white beneath, with a number of very fine striæ rising on the margin; base livid white. Length, 1·8–2·2 inches.

Annaa I., Pacific O.

The younger shell is pale fulvous, encircled with four carnelian bands, and the adult is a truly solid mass of enamel.

C. ARENOSA, Gray. Pl. 6, figs. 1, 2.

Base more convex than the preceding, the back has a similar ornamentation, but the margins are ash-brown, arenaceously striated above, and the base is ivory-white; teeth fine and numerous. Length, 1·1–1·5 inches.

Annaa I., Central Pacific.

The young shell is pale brown, with four carnelian bands.

C. SULCIDENTATA, Gray. Pl. 6, figs. 3, 4.

Differs from *C. arenosa* in the teeth, the interstices of which are deeply excavated, the colors are duller and the base is smoky

white; some specimens are of a bright yellow color, with the bands dark buff. Length, 1·8 inches.

Australia, *South Seas*, *Sandwich Is.*

C. TESSELLATA, Swn. Pl. 6, figs. 5, 6.

Back yellowish brown, with three broad bands, sides tessellated with square brown and white spots, the two upper spots on both sides chestnut; base variegated brown and white. teeth small, numerous and tinged orange. Length, 1·2 inches.

New Zealand, *Sandwich Is.* (?)

** *Dorsal surface spotted.*

C. MAURITIANA, Linn. Pl. 7, figs. 8, 9, 10, 11.

Back humped, brown, covered with light brown or white spots of irregular size, sides and base dark brown, almost black; teeth prominent, margin angulated. Length, 2·3–4 inches.

Samoa, *New Caledonia*, *Borneo*, *Ceylon.*

The young shell (fig. 11) is first fulvous-brown, with bands of a yellowish hue arranged in waves, later the waves become massed, leaving the yellow in triangular flame-like spots; the margins do not thicken and become angulate until after the development of the teeth.

This mollusk must possess great muscular power, for its shell is the heaviest and most solid of the genus.

C. CAPUT-SERPENTIS, Linn. Pl. 6, figs. 98–100; Pl. 23, fig. 59.

Reddish or blackish brown; the spots on the back having the appearance of snow-white specks of unequal size; extremities tipped with white; base grayish white, teeth conspicuous, white. Length, ·95–1·35 inches.

Indian and Pacific Oceans.

The young shell (fig. 100) is ashy blue, with a single, rather broad central band. A more elongate variety (Pl. 23, fig. 59) of a uniformly darker color and with margins less angular, has been wrongly identified by authors as the *C. caput-anguis*, Phil. Compared with *caput-serpentis*, Pease says it is smaller in size, and the spots are smaller, but specimens labeled *caput-anguis* and sent to the Philada. Acad. Nat. Sciences by Mr. Brazier, who collected them at Ballenger River, N. S. W., are fully as large as the typical form. The animal of *C. caput-serpentis* is brown, tentacula red-spotted.

*** *Spots extending over the base.*

C. MAPPA, Linn. Pl. 7, figs. 12–14; Pl. 8, fig. 17.

Back violet-brown, arranged in longitudinal lines of a hieroglyphic character, dorsal line whitish and peculiarly branched; sides and base whitish to pink, teeth saffron-red, numerous, and confined to the interior of the aperture; base sometimes ornamented on the columellar side with a violet blotch.

Length, 2·3–3·4 inches.

New Caledonia, *Java*, *Indian O.*

C. nigricans, Montr. (Pl. 8, fig. 17), is a rostrate variety from New Caledonia, the dorsal surface of which is black.

Length, 3·85 inches.

C. ARABICA, Linn. Pl. 8, figs. 18, 19, 23, 24.

Back livid brown, with a line ornamentation similar to *C. mappa*, the dorsal line is straight and the spots more numerous, those on the sides being dark-brown, base tinged brownish; teeth reddish brown; extremities blackish. Length, 1·6–3 inches.

Samoa, *New Caledonia*, *Australia*, *Indian Ocean.*

Young shell bluish, banded with brown waves. Animal black-brown, with a yellow edge to the foot. *C. eglantina*, Ducl. (fig. 24), is a grayish variety with white spots, improperly credited to California.

An oblong, rostrate, dark-brown or nearly black form, with black spots and a whitish base and beaks, found at New Caledonia, has been incorrectly identified as *eglantina*. For this variety I propose the name *niger* (fig. 23).

C. RETICULATA, Martyn. Pl. 8, figs. 20–22.

Differs from *C. Arabica*, its nearest ally, in being broader and having more thickened sides, the dorsal spots are more crowded and sometimes run together, presenting a clouded surface; base dull milky-white to bluish, the columellar side ornamented with a dark reddish brown blotch near the middle of the shell; teeth stronger than those of *C. Arabica*, but similarly colored; aperture wider. Length, 1·4–3 inches.

Indian and Pacific Oceans.

This species sometimes very closely resembles the preceding. It can, however, be distinguished by the increased number of the

spots, and the comparative absence of the hieroglyphic markings so peculiar to the typical *C. Arabica.*

The young shell is very much like that of *Arabica.* The small variety, *C. intermedia*, Gray (fig. 20), differs in having a creamy-white base without the brown blotch, it being ornamented instead with numerous small brown spots that extend over the margins; the dorsal spots are much smaller. Length, 1–1·8 inches.

By an error of the printer the illustration of fig. 20 is marked ⅔ natural size. The figures should be erased.

C. HISTRIO, Meusch. Pl. 8, figs. 25, 26.

More pyriform than *C. reticulata*, sides less thickened, base white, without the brown-blotch ornamentation.

Length, 2·5–3 inches.

Tonga Tabou; Indian Ocean.

Although some monographers have placed this with the synonomy of *C. reticulata*, yet I have always been able to separate the two. There is, however, a close relationship between *Arabica*, *reticulata* and *histrio*, but not more so than is to be found in many other groups belonging to this interesting family.

C. ARABICULA, Lam. Pl. 9, figs. 35, 36.

Bluish green, very closely reticulately painted with brown; margins reddish brown and spotted with black, extremities produced angularly, base whitish, teeth fine, deeply cut.

Length, ·9–1·2 inches.

Acapulco; Gulf of California (Stearns).

C. GEMMULA, Weink. Pl. 7, figs. 15, 16.

Grayish yellow, longitudinally closely lined with chestnut-brown; margins like those of the preceding species.

Length, about ·8 inch.

Red Sea.

Weinkauff says of this species that it presents on the dorsal surface, the appearance of *C. Arabica* in miniature, while its base resembles *arabicula.*

C. STERCORARIA, Linn. Pl. 9, figs. 27, 28.

Greenish blue, the brown spots frequently running together,

giving the back a clouded appearance; sides and base brown; teeth whitish. Length, 1·8–3·2 inches.

West Africa.

Young shell ashy brown, banded. When the shell presents a humped appearance on the back, it forms the *C. rattus*, Lam., which can hardly be said to be even a variety, since the young shells of *stercoraria* are all more or less humped.

C. Scotti, Brod. Pl. 9, figs. 29, 30.

Pale ashy blue, clouded with yellowish brown; sides and base very dark brown; aperture narrow; teeth small, nearly obsolete on the columellar side. Length, 2·8–3·5 inches.

West Australia.

A peculiar oblong boat-shaped shell with the extremities produced and curved upwards.

C. thersites, Gask. Pl. 9, figs. 31, 32.

Shorter and more gibbous than *C. Scotti*, teeth on the outer lip much stronger; the colors are deeper and the dorsal spots are more clouded; base near the aperture white.

Length, 2·75–3 inches.

South Australia.

Specimens of this richly-colored shell have been found painted almost jet-black.

C. marginata, Gask. Pl. 9, figs. 33, 34.

Very light brown, some of the dorsal spots running together, giving an irregular lined appearance. Length, 2·25 inches.

Australia.

This shell has such an immature look that it is most likely the young of *C. thersites*. It is very rare.

C. decipiens, E. A. Smith. Pl. 10, figs. 39, 40.

Smaller than *C. thersites*, back higher and more humped, base flatter and of a rich orange-red color, which extends over the sides of the shell; body-whorl within the aperture, white.

Length, 2·25 inches.

North Australia.

C. venusta, Sowb. Pl. 10, figs. 44, 45.

Cream-color with a cinnamon tinge, variegated with rather large orange-brown spots of irregular size, and irregularly dis-

tributed, the cinnamon tinge slightly deeper at the extremities, base white; teeth thick and faint purplish white.

Length, 3 inches.

Dampier's Is., West Australia.

This shell, which Dr. J. C. Cox has lately published under the name *C. Thatcheri*, was fully described in the Annals and Mag. Nat. Hist., xix, 1849, by Mr. G. B. Sowerby, notwithstanding the statement in Thes. Conch. that "no publication strictly so-called" of *C. venusta*, "can now be proved." The species is very rare.

Group B. Shell sometimes nodose or tuberculated.

C. MUS, Linn. Pl. 10, figs. 41, 42, 43.

Shell oval, marbled with olive-brown, especially near the sides, which are but faintly margined; dorsal line pale, and bordered with brown spots, which are sometimes scattered over the dorsal surface; posterior extremity ornamented with a large brown spot, base ash-brown, teeth brown, nearly obsolete on the columella, which is stained dark brown. Length, 1·25–1·75 inches.

Atlantic O., Mediterranean.

Fossil near Plaisantin.

The name *C. bicornis* (fig. 43) has been suggested for the nodose examples.

Young shell, ventricose, pale ash-brown, and longitudinally peculiarly waved.

C. LEUCOSTOMA, Gask. Pl. 10, figs. 37, 38.

Differs from *C. mus* in being more solid; the dorsal line is branched, and the spots on the sides are more numerous and distinct, the base is white and the teeth are nearly obsolete.

Length, 2 inches.

Mocha, Arabia.

C. MONETA, Linn. Pl. 10, fig. 46; Pl. 11, figs. 51–54; Pl. 23, figs. 60–69.

Color varying from white to deep yellow, back sometimes encircled with a faint orange or red ring, margins very thick, base tuberculated to smooth, teeth obtuse.

Length, ·6–1·5 inches.

Maldive Is., Australia, Taheiti, Japan.

C. icterina, Lam. (Pl. 23, fig. 62), is a smooth, elongate variety.

C. Barthelemyi, Bernardi (Pl. 11, figs. 53, 54), is a distorted variety from New Caledonia. Length, 1·45 inches.

C. ethnographica, Rochebr. (Pl. 23, fig. 63), is a small tuberculated form, ornamented with a yellow ring.

C. mercatorium, Rochebr. (Pl. 10, fig. 46; Pl. 11, fig. 52), is dirty yellowish, lightly olive-tinted, and not so strongly tuberculated.

C. atava, Rochebr. (Pl. 23, figs. 64, 65), is a small example of *C. mercatorium*.

C. pleuronectes, Rochebr. (Pl. 23, figs. 66, 67), resembles somewhat the *C. icterina*.

C. vestimenti, Rochebr., is another name for the distorted variety *Barthelemyi*.

C. camelorum, Rochebr. (Pl. 23, fig. 68), is a small smooth oval form, which Dr. Rochebrune says he has collected alive in large quantities on the West Coast of Africa.

C. plumaria, Rochebr. (Pl. 23, fig. 69), is a narrow-banded form, credited to the Sandwich Is. It appears to be a less developed *atava*.

Dr. Rochebrune, in a monograph of the mollusks of Cape Verd Is., says he has fished *C. moneta* alive at Senegal.

The species is found fossil in the conglomerate of Santiago, C. Verd.

C. ANNULUS, Linn. Pl. 11, figs. 57–61; Pl. 23, figs. 70–72.

Smooth, smoky white; dorsal surface ornamented with a deep orange ring, which encircles a bluish or grayish centre; teeth strong, base smooth. Length, ·45–1·2 inches.

Indian and Pacific Oceans.

Fossil in the Tertiary of Southern Europe. Dr. Layard found specimens in the ruins of Nimrod, which had the appearance of having been used for adornment.

C. Noumëensis, Marie (fig. 59), is a New Caledonian variety

having double orange lines on the dorsal surface. Length, 1·2 inches.

C. Hamyi, Rochebr. (Pl. 23, fig. 70), is a rosy white, yellowish-tinted and spotted shell from Zanzibar; it is probably a small *annulus*. The spots referred to are not shown on the figure given by Dr. Rochebrune, but appear on that of *annulus*.

C. Harmandiana, Rochebr., is well represented by figs. 60, 61.

C. Perrieri, Rochebr. (Pl. 23, figs. 71, 72), is one of those forms connecting *annulus* with *obvelata*.

In the report of the Voyage of the Samarang, Mr. Arthur Adams says that while at Singapore, he observed the fry of *C. annulus* (fig. 58) adhering to the mantle and other parts of the animal in conglomerated masses of minute transparent shells, which, when placed in a watch-glass of salt water, became disintegrated, and detached individuals were observed quitting the rest and moving in rapid gyrations by means of two winged membranous expansions. When at rest they returned to the mass or adhered to the edge of the watch-glass.

This and the following species are probably only varieties of *C. moneta*, but the differences are usually so well marked that they can be easily separated. The museum of the Acad. Nat. Sciences of Philadelphia, however, contains a series of these shells showing how they pass from one to another in regular gradation.

Dr. Rochebrune, who has studied this group with a view to differentiation (Monograph of the genus Monetaria, Bull. Soc. Malac., France, 1884), has selected a certain number of these transitory forms for specific description, the names of which have been given above; it would be easy to multiply them to almost any extent.

C. OBVELATA, Lam. Pl. 11, figs. 55, 56.

Sides thickened and puffed out, giving the dorsal surface an oval, intrenched appearance; back blue, teeth very strong.

Length, ·6–1 inch.

New Caledonia, Samoa, Australia.

Section III. (*Luponia, Gray, pars.*) *Shell pyriform or pyriformly ovate, usually spotted.*

Group A. Shell smooth, not margined.

* *More or less ventricose or inflated.*

C. AURANTIUM, Martyn. Pl. 11, fig. 48.

Shell unspotted, back, teeth and interstices bright orange, base, sides and extremities white. Length, 3·6 inches.

Fiji Is., Solomon Is., Loyalty Is.

The large and finely colored specimens come from the Loyalty Is., while those from the Fijis are smaller. This species, though an old one, is yet quite rare; good specimens costing about $10.00 each. The highest order of dignity among the Friendly Islanders, is typified by the permission to wear this shell as an ornament.

C. PRINCEPS, Gray. Pl. 11, fig. 47.

Yellowish, tinged with rose-purple, fainter towards the base, profusely painted in the middle with waved yellowish-brown hieroglyphic markings, clouded on each side with a large rhomboidal dark-clouded blotch; extremities adorned with three irregular concentric brown lines, the middle of which is the strongest, on the posterior extremity are several finer light brown concentric striæ; sides ornamented with blue and brown spots, more or less distinct; base and teeth white.

Length, 3·9 inches.

Persian Gulf, New Guinea.

Though one of the oldest, this species is still of the greatest rarity, and for a long time the British Museum possessed the only specimen known to exist. Lately Dr. J. C. Cox, of Sydney, N. S. W., has secured a fine example, which he states was found on the southern shore of New Guinea.

C. TIGRIS, Linn. Pl. 11, figs. 49, 50; Pl. 15, fig. 8, (Dentition).

Whitish or yellowish, sometimes clouded with chestnut-brown, promiscuously painted with rather large blackish blue clouded spots; base white; teeth large, sometimes bifurcate.

Length, 2·5–4·3 inches.

Indian and Pacific Oceans.

Young shell (fig. 50) chestnut to whitish, ornamented with

interrupted bands or zigzag rusty-brown flashes. In its growth, this species exhibits a curious variety in the style of coloring. It is first chestnut, the color then breaks up into close-set waved blotches, then a coating of white follows, upon which is deposited a series of zigzag flames. There is a second layer of white enamel which nearly obscures these zigzag markings, and a number of dark spots are deposited. These are again overspread by a third white coating intermixed with numerous rich black and brown spots. The soft parts adhere so firmly to the shell that they cannot be removed until decomposition has taken place.

C. PANTHERINA, Soland. Pl. 12, figs. 62, 63.

Whitish to chestnut-red, profusely adorned with small blackish-brown spots, which sometimes run together, sides and base whitish, aperture gaping anteriorly, teeth small.

Length, 2–3 inches.

Red Sea.

The last coating of enamel is sometimes dark reddish brown. Younger shell ashy green, mottled with red and yellow.

C. UMBILICATA, Sowb. Pl. 12, figs. 65, 66.

Differs from the preceding in being more depressed anteriorly, the extremities are more produced and beaked, and the aperture is more sinuous; spire deeply umbilicated, teeth brownish-tinted; dorsal spots light brown. Length, 3 to 3·6 inches.

New South Wales.

Dr. J. C. Cox, in Proc. Linn. Soc. N. S. W., for 1879, reported an almost pure white variety from Circular Head, N. S. W., for which he proposed the varietal name *alba*.

C. LEUCODON, Brod. Pl. 12, figs. 69, 70.

Reddish or yellowish brown, sprinkled here and there with rather large round white spots, base pale brown, marked transversely with fine striæ, teeth white, strong on both sides.

Length, 3·4 inches.

Habitat?

The only specimen known is in the British Museum. The broad teeth and deeply undercut interstices are very like those of *C. sulcidentata*.

C. VITELLUS, Linn. Pl. 13, figs. 72, 73.

Fulvous bay-color sprinkled with snow-white spots of various sizes, sides olive-brown, arenaceous, striated, base and teeth whitish. Length, 1·2–2·7 inches.

Indian Ocean, Australia, New Caledonia.

Young shell olive-ash, obscurely banded, unspotted. This species is strongly characterized by the sand-like striæ of the sides.

C. NIVOSA, Brod. Pl. 12, figs. 67, 68.

Differs from the preceding in its more oblong form, more irregular and confused arrangement of spots, and entire absence of the sand-like striæ; the teeth and base are yellowish white, and the pale brown color of the back extends around the sides of the shell. Length, about 2·4 inches.

Mauritius.

C. BRODERIPII, Gray. Pl. 12, fig. 64.

Differs from *C. nivosa* in being more ovate and delicately tinted rose-pink. The aperture is wider and the teeth longer. Length, 3 inches.

Madagascar.

A beautiful species of great rarity.

C. CAMELOPARDALIS, Perry. Pl. 13, fig. 76.

Differs from *C. vitellus* in the absence of the sand-like striæ; the interstices between the columellar teeth are stained purple-black, the extremities are prominent, and the sides are white and sometimes slightly margined. Length, 1·7–2 inches.

Red Sea.

C. BARCLAYI, Reeve. Pl. 12, fig. 71; Pl. 13, fig. 82.

White, profusely ornamented with orange-buff dots of different degrees of tone, extremities and teeth bright orange; teeth strongly developed, those on outer lip extending over the base. Length, 1·05 inches. *I. Diego Garcia, Mauritius.*

A deep-water species.

** *More or less oblong or subpyriform.*

C. SPADICEA, Swn. Pl. 13, figs. 78.

Chestnut-brown, clouded towards the sides with burnt brown, sides pinkish white, base and teeth white. Length, 1·3–2 inches.

Sta. Barbara—S. Diego, Cal.

C. ONYX, Linn. Pl. 13, figs. 77, 79, 80, 81.

Whitish, with two obscure zones; extremities, base and sides jet-black, edged above with orange-brown. Length, 1·1–2 inches.

Ceylon, *Japan*, *Philippine Is.*

This species presents three distinct varieties of coloring. In addition to the above, there are the uniformly orange-cream and the chestnut-brown painting, the extremities, base and sides in each case being of a deeper shade.

C. PYRUM, Gmel. Pl. 13, figs. 83–85.

Yellowish, four-banded, richly marbled with chestnut-brown, sides brownish or deep orange-red, faintly spotted, base and extremities orange, teeth whitish. Length, 1·4–2 inches.

Mediterranean Sea, *Atlantic Coast of S. Europe* and *Africa*.

Occurs fossil under the name of *C. porcellus*, Brocc.

The *C. Petitiana*, Crosse and Fischer (figs. 85), credited to Senegal, appears to be a dwarfed variety of *pyrum*.

C. PHYSIS, Brocchi. Pl. 13, figs. 74, 75.

Differs from the preceding in having a whitish base and more minute teeth; the back is confusedly painted with reddish and yellowish dashes. Length, 1·2 inches.

Sicily.

Fossil in the Pliocene as *C. pyrula*, Mich.

C. LYNX, Linn. Pl. 14, figs. 86, 87, 98.

Whitish to brownish, profusely spotted and clouded with fulvous-brown and blue, interspersed with unequal dark blackish-brown spots; sides, teeth and base whitish, interstices between the teeth bright blood-red. Length, ·85–2·4 inches.

Indian O., *Australia*, *New Caledonia*, *Red Sea.*

Young shell white, faintly banded and profusely spotted with light brown.

An extremely variable species, sometimes slightly margined, The distorted variety (fig. 98), from New Caledonia, has been named *C. Caledonica* by Mr. H. Crosse.

C. ERRONES, Linn. Pl. 14, figs. 88, 89, 7.

Bluish green, faintly banded, freckled with minute light-brown specks; sometimes painted in the centre with a large chestnut blotch; anterior extremity occasionally ornamented on each

side with a brown spot, sides white to yellowish, sometimes slightly margined, base whitish. Length, ·8–1·35 inches.

China, *Australia*, *N. Caledonia*, *Indian O.*

C. Sophiæ, Brazier. Pl. 14, figs. 3, 4.

Closely allied to *C. errones*, from which it differs in being bright orange between the teeth, base fulvous-yellow. Length, 1 inch.

San Christoval I.

C. Coxi, Brazier. Pl. 14, figs. 96, 97.

Light orange-yellow, or cream-color, ornamented with two faint yellowish-white bands, teeth thick, yellowish white. Length, ·83 inch.

Dupuch's I., N. W. Australia.

Appears to be a young shell.

C. subviridis, Reeve. Pl. 14, figs. 99, 100.

Differs from *C. errones*, in being more pyriform, and strongly umbilicated at the spire. It is sometimes slightly margined. Length, 1·4–2·5 inches.

Australia, *New Caledonia.*

The largest specimens are reported from New Caledonia.

C. pallida, Gray. Pl. 14, figs. 90, 91.

Greenish yellow, minutely freckled with brown, sides spotted here and there with chestnut, base whitish; dorsal surface sometimes ornamented with a chestnut blotch. Length, ·8–1 inch.

Japan.

C. pulchella, Swn. Pl. 14, figs. 92, 93.

Whitish, minutely dotted with fulvous specks, with two bands of semilunar blotches, or a large irregular chestnut-brown splash, teeth and ridges red. Length, 1·5 inches.

China.

An elegant, pear-shaped shell, well characterized by the peculiar extension of columellar teeth in ridges across the base.

C. pyriformis, Gray. Pl. 14, figs. 5, 6, 94, 95.

The anterior extremity is not so attenuated as in *C. pulchella*, and the teeth on the outer lip are white; those on the columella are red, but do not extend so far over the base as in *C. pulchella*. Length, 1·3 inches.

Australia, *Borneo*, *Ceylon.*

The variety *Smithi*, Sowb. (figs. 94, 95), is smaller; the back

looks like *C. macula*, but the teeth, which on the inner lip are reddish brown, have the peculiar appearance of those of *C. pyriformis*.

C. WALKERI, Gray. Pl. 15, figs. 10, 14, 15; Pl. 17, fig. 68; Pl. 14, figs. 1, 2.

Bluish white, three-banded, freckled with minute yellowish brown specks, sides yellowish, brown-spotted, base and interstices between the teeth purple-violet, teeth small, those on the inner lip numerous. Length, ·75–1·2 inches.

Australia (rare), *New Caledonia*, *New Guinea*.

Mr. John Brazier believes this to be a deep-water species.

The variety *Bregeriana*, Crosse (Pl. 15, figs. 14, 15), has an orange-red base and the extremities are spotted, margins besprinkled with fine white specks, imbedded in the enamel similar to those in *C. testudinaria*.

C. amabilis, Jousseaume (Pl. 14, figs. 1, 2), is a variety, the extremities of which are more produced and somewhat recurved, the bands are narrower, and the marginal spots fewer in number, the purple tinting is confined to the inner lip. Length, ·75 inch.

The figure here given is copied from a drawing kindly communicated by Dr. Jousseaume.

Group B. Shell smooth, margined.

* *Margins not pitted.*

C. NIGROPUNCTATA, Gray. Pl. 15, figs. 18, 19.

Bluish, freckled with pale fulvous-brown, sides closely dotted with black, base yellowish, teeth sharply cut.

Length, 1·35–1·55 inches. *Galapagos Is.*

C. SOWERBYI, Kien. Pl. 15, fig. 9.

Whitish, obscurely four-banded, closely painted with unequal chestnut-brown spots, sides and base brownish yellow, sides and extremities dotted blackish brown, teeth whitish.

Length, 1·2–1·6 inches. *Gulf of California.*

The *C. ferruginosa* of the same author is an inferior example of this species.

This species has been incorrectly credited to the Gambia R., W. Africa, and the Cape Verd Is.

C. LENTIGINOSA, Gray. Pl. 15, figs. 20, 21.

Bluish white, with three obscure bands of waved blotches, freckled with yellowish- or reddish-brown spots, extremities blackish brown; teeth large, somewhat distant; base whitish.

Length, 1·3–1·45 inches.

Ceylon.

C. ZONATA, Chemn, Pl. 15, figs. 22, 23, 11.

Bluish or greenish, zoned across the middle with more or less distinct waved spots, marbled fulvous-brown, sides and base smoky brown, spotted with black, extremities painted black on both sides; teeth strong. Length, ·95–1·3 inches.

Mouth of the Gambia River.

C. nebulosa, Kiener (fig. 11), is a variety having a white base; the dorsal surface has a weathered appearance, and the marginal spots are pale reddish brown.

C. PICTA, Gray. Pl. 15, figs. 30, 31.

Distinguished from the preceding, to which it is closely allied, by its angular form and depressed base; the teeth are not so strong, those on the inner lip being small and confined to the inside of the aperture. Length, 1–1·3 inches.

Gambia; Cape Verd Is.

C. SANGUINOLENTA, Gmel. Pl. 15, fig. 16, 17.

Ashy purple, freckled with olive or light brown, and ornamented with a central brown blotch, sides and base purplish white, covered with purple spots; columellar teeth confined to the inside of the aperture. Length, 1 inch.

Gambia.

C. XANTHODON, Gray. Pl. 15, figs. 24, 25.

Bluish, dotted with minute orange specks, sides orange, spotted with brown; teeth and base fulvous yellow.

Length, 1·2–1·4 inches.

Australia.

Mr. John Brazier believes this to be a deep-water species; some of his specimens are nearly jet-black, with a dark olive interior.

C. PUNCTULATA, Gray. Pl. 15, figs. 28, 29.

Pale bluish, freckled with chestnut-brown, sides salmon-yellow,

sometimes smoky and spotted with blackish brown; base white; teeth strong. Length, ·8–1·2 inches.

Mazatlan—Panama.

C. UNDATA, Lam. Pl. 16, fig. 33.

Rich plum to chestnut, ornamented with two or more zigzag zones of white; sides and base white, dotted with brown; anterior extremity edged dark chestnut.

Length, ·65–1·2 inches.

Philippines, Mauritius.

C. ZICZAC, Linn. Pl. 15, figs. 12, 13.

Whitish, ornamented with longitudinal zigzag yellow lines, sides and base yellow, spotted with reddish brown, the spots forming a circle around the posterior extremity.

Length, ·55–1 inch.

Mozambique, Ceylon.

There is a variety of this well-known species in which the zigzag lines resolve themselves into distinct bands.

C. LUTEA, Gronovius. Pl. 16, figs. 35, 36.

Yellowish or brownish, profusely dotted with brown; base somewhat like that of *C. ziczac*. Length, ·75–1 inch.

New Caledonia, Australia.

Younger shell olive-brown, faintly spotted, with two narrow milky blue zones. The fully matured shell was named *C. Humphreysi* by Dr. Gray.

C. ASELLUS, Linn. Pl. 16, fig. 34.

Ivory-white, ornamented with three broad bands of reddish or chocolate-brown; sides and base white. Length, ·55–1 inch.

Australia, Samoa, Red Sea (?).

The young shell is entirely encircled by the characteristic dark bands.

C. CLANDESTINA, Linn. Pl. 16, figs. 37–40, 61.

Pinkish cream to pale bluish, faintly banded, ornamented with extremely faint reddish-brown hair-lines, converging here and there to a point; sides and base white; teeth strong.

Length, ·5–·75 inch.

Ceylon, Japan, Australia.

C. candida, Pease (figs. 39, 40), is a pure white variety. *C.*

Artuffeli, Jouss. (fig. 61), is apparently another variety, of a yellowish-brown color, without the characteristic faint hair-lines. Future investigation may prove this to be a distinct species.

C. SAULÆ, Gask. Pl. 16, figs. 41, 42.

Light fawn, dotted with a few small chestnut-brown spots, with larger ones on the margin, and a large blotch of the same color on the back; base light reddish yellow to whitish; beaks and interstices between the teeth more or less orange; teeth prominent. Length, ·87 inch.

Bay of Manilla.

According to Brazier, found also in the Torres Straits at 6 fathoms.

C. GRACILIS, Gask. Pl. 16, figs. 43, 44.

Differs from the preceding in being more pyriform, the central blotch is wanting, as are also the smaller dorsal spots, the base is sparsely dotted with reddish brown, the teeth are finer and there is an absence of color between them. Length, ·65–·85 inch.

Isl. Bourbon; China Sea (?).

C. PUNCTATA, Linn. Pl. 16, figs. 51, 52; Pl. 15, figs. 26, 27, 32.

Whitish to cream-color, spotted with brown, teeth and extremities golden yellow. Length, ·5–·9 inch.

Isl. Bourbon; Philippines; Borneo.

C. stercus-muscarum, Lam. (Pl. 15, figs. 26, 27), is a variety having finer spots and smaller teeth, which are colorless, those on the inner lip being confined more to the margin of the aperture.

C. trizonata, Sowb. (Pl. 15, fig. 32), is a more cylindrical variety having a zoned appearance.

C. ANGUSTATA, Gmel. Pl. 16, figs. 47, 48, 45, 46.

Yellowish or chocolate-brown, sides whitish, marked with large chestnut-brown spots, extremities painted on each side with a chestnut-brown spot, base whitish to reddish, teeth small. Length, 1–1·2 inches.

So. Australia.

C. Comptoni, Gray (figs. 45, 46), is a variety with a convex, pale or nut-brown base.

C. DECLIVIS, Sowb. Pl. 16, fig. 53.

Creamy white, freckled with brownish, giving the shell the appearance of having been dusted over with capsicum pepper. Marginal spots few in number, dorsal line broad, base similar to *C. angustata*. Length, ·9–1·2 inches.

Portland, Victoria.

Referring to *C. angustata*, Dr. Gray says: "When complete, the back of the shell is pale whitish brown, with a broad subcentral dorsal line, and minutely freckled with brown specks." As this description corresponds closely with that of *declivis*, it is quite possible that the two species are identical.

C. PIPERITA, Soland. Pl. 16, figs. 49, 50, 58.

Pale chestnut-brown, obscurely minutely dotted and ornamented with four narrow interrupted bands, base white, teeth small, sides brown-spotted. Length, ·65–1 inch.

Australia.

The variety *bicolor*, Gask. (fig. 58), is usually three-banded, and presents sometimes a zigzag appearance, occasioned by the coalescence of the central bands. Worn shell, pale flesh-color.

C. PULICARIA, Reeve. Pl. 16, figs. 59, 60.

Differs from the preceding in being more cylindrical, the bands are more broken up into spots, and the dots on the back are more conspicuous. Length, ·65–1 inch.

Australia.

C. ALGOENSIS, Gray. Pl. 16, figs. 56, 57.

Yellowish, sides and back dotted with reddish brown, base white, teeth on outer lip strong, those on inner lip nodular, aperture rather wide. Length, 1–1·2 inches.

Algoa Bay.

C. FUSCO-DENTATA, Gray. Pl. 16, figs. 54, 55.

Dirty drab, covered with rufous-brown close spots, like those on *C. errones*, but larger, and more suffused; teeth brown, rugose, ridged across the base. Length, 1·4–1·6 inches.

Cape of Good Hope.

Young shell somewhat ribbed across the back.

C. SIMILIS, Gray. Pl. 16, figs. 62, 63; Pl. 17, fig. 69.

Yellowish to rich chestnut-brown, covered with blotches of a deeper shade, teeth orange, those on the outer lip strong and

elongated across the base, the inner ones small and confined to the aperture. Length, 1·4–1·85 inches.

Cape of Good Hope.

This shell in a perfect condition is the *C. castanea*, Higgins (Pl. 17, fig. 69). The specimens usually found in collections, however, are of a yellowish color and are without any dorsal ornamention except around the spire, where it is sometimes brownish.

** *Margins more or less pitted, dorsal spots usually ocellated.*

C. CRIBRARIA, Linn. Pl. 17, figs. 71, 72.

Yellowish brown, dorsal spots round, white, sides and base white, teeth numerous, those on the inner lip confined to the interior of the aperture. Length, ·7–1·1 inches.

Ceylon, New Caledonia, New Ireland.

Mr. Rossiter, of New South Wales, reported having obtained specimens of a blackish-brown color, showing but few of the white spots, and 1·5 inches long.

Although this species may be said to possess no marginal spots, yet out of a large number of specimens examined I have found one with a slight indication of their presence.

C. fallax, E. A. Smith, is an unfigured variety, credited to West Australia. It differs from the normal shell in being larger, more pyriform, white spots smaller and less clearly defined; they appear to blend into the fawn-color of the dorsum, which is paler than in *C. cribraria.*

C. CRIBELLUM, Gask. Pl. 17, figs. 66, 67.

Smaller and more cylindrical than *C. cribraria*, extremities more obtuse, aperture wider, margins spotted. Length, ·7 inch.

Mauritius.

C. COXENI, Cox. Pl. 17, figs. 64, 65.

Differs from *C. cribraria*, in the dorsal ornamentation, which is in irregular elongated dark chestnut markings, teeth coarser and prominently produced a little more than half-way across the base. Length, ·92 inch.

Solomon Islands.

C. ESONTROPIA, Ducl. Pl. 17, figs. 76, 77, 75.

Yellowish to light brown, spotted with white, margins deli-

cately dotted with reddish-brown, the dots extending somewhat over the base. Length, ·70–1 inch.

Philippines, Sandwich Is.

Sowerby calls the pale yellow variety from the Sandwich Islands *C. Peasei* (fig. 75).

C. GASKOINI, Reeve. Pl. 17, figs. 73, 74.

Yellowish, ornamented with small white eyes, encircled with pale brown rings, sides dotted with chestnut, base white, teeth strong. Length, ·6–·8 inch.

Hab.?

C. CUMINGI, Gray. Pl. 17, fig. 78, 79, 70.

Differs from the preceding in being more attenuately drawn out anteriorly, extremities produced, teeth extremely minute, especially those on the inner lip. Length, ·4–·8 inch.

Society Is.

C. compta, Pease (fig. 70), is a variety in which the spots on the back are not ocellated, and the dorsal line is flexuose.

C. BECKI, Gask. Pl. 17, figs. 86, 87.

Yellow, spotted with large and small white eyes, the large ones pupilled with chestnut, sides dotted with chestnut; teeth small, those on the outer lip strong and tinted with chestnut-brown. Length, ·5 inch.

Red Sea, Eben I.?

C. MACANDREI, Sowb. Pl. 17, figs. 88, 89.

Probably only a variety of the preceding. Length, ·7 inch.

Red Sea.

C. MARGARITA, Sol. Pl. 17, figs. 81, 82.

Pale straw-color, white-spotted, base white unspotted, teeth very minute, extending into the aperture near the extremities in fine ridges. Length, ·4–·6 inch.

Annaa I.

A very delicate little shell, possessing some few characters which belong to Section IV; its general affinities are here.

C. GUTTATA, Gray. Pl. 17, figs. 83, 84.

Yellowish or reddish brown, sprinkled with white spots of various sizes; the teeth extend across the base and over the

sides in bright saffron-red ridges which are somewhat irregular, and are here and there forked. Length, 2·6 inches.

New Britain, *N. S. Wales* (Hobson), *Red Sea* (Jickeli).

An extremely rare and beautiful species, of which the Acad. Nat. Sciences Philada. possesses a fine specimen, the gift of the late Dr. Thos. B. Wilson.

C. LAMARCKI, Gray. Pl. 18, figs. 96, 97.

Yellow, varying from orange to greenish, profusely covered with white spots, the larger of which are sometimes ocellated; sides marked with reddish-brown spots, and the extremities with lines; base white, teeth strong. Length, 1·2–1·7 inches.

Indian and Pacific Oceans.

C. MILIARIS, Gmel. Pl. 17, fig. 80.

Differs from the preceding in being narrower, the dorsal spots are smaller and never ocellated, and the sides are white.

Length, 1·2–1·5 inches.

Japan, *N. S. Wales.*

C. EBURNEA, Barnes. Pl. 17, fig. 85.

Differs from *C. Lamarcki*, Gray, in being pure ivory-white.

Length, 1·5–1·9 inches. *Philippines.*

C. TURDUS, Lam. Pl. 18, fig. 91.

Whitish, sprinkled with small reddish-brown dots, those on the anterior extremity appearing sometimes as dashes, base white, and rather flattened. Length, ·7–1·5 inches.

Persian Gulf.

Sowerby in Thes. Conch. Monog. Cypræidæ, calls attention to an elongated variety for which he suggests the name *pyriformis*.

C. EROSA, Linn. Pl. 18, figs. 90, 100, 1.

Pale bluish to citron-yellow, thickly covered with white specks, and sprinkled with ocellated brownish ones; sides white, stained in the middle with a square brownish-black spot; extremities ridged with chestnut-brown; teeth strong, outer ones extending across the base and frequently over the side, base white, sometimes spotted and streaked with chestnut-brown.

Length, ·8–1·8 inches. *Indian and Pacific Oceans.*

An abundant and extremely variable species, which sometimes occurs very much flattened; the large brownish black square spots on the sides are peculiarly characteristic.

C. OCELLATA, Linn. Pl. 18, figs. 92, 93.

Reddish yellow, profusely covered with white spots, some of which are ocellated, with black sides and base whitish, dotted with brown; teeth strong, those on outer lip tinged with brownish at the base. Length, ·6–1·2 inches.

Ceylon.

There appear to be two forms of this well-marked species, the one broad, with swollen sides, and the other more elongate and slender.

C. LISTERI, Gray. Pl. 18, figs. 94, 95.

Pale olive, ornamented with white spots, some of which are ringed with brown, sides and base delicately tinted with violet, dashed and dotted with purple, teeth numerous, rather strong. Length, ·75–1·2 inches.

Philippines.

C. PORARIA, Linn. Pl. 18, figs. 2, 3.

Brownish purple, ornamented with white spots, most of which are encircled with brownish rings, sides and base violet, teeth white. Length, ·7–·9 inch.

Fiji Is., *Australia*, *New Caledonia.*

Some of the specimens from New Caledonia are dark purple, and destitute of white spots (Brazier). According to W. H. Pease, this species occurs semi-fossil in the Sandwich Islands.

C. ALBUGINOSA, Mawe. Pl. 18, figs. 98, 99.

Differs from the preceding in being more elongate, the extremities are rather more produced, and the marginal pittings almost obsolete, nearly all the dorsal spots are ocellated, and the base is white, violet-tinged at the margin. Length, ·8–1·2 inches.

Gulf of California.

C. BICALLOSA, Gray. Pl. 18, figs. 5, 6, 4, 7.

Uniformly reddish saffron, back variously clouded and mottled with chestnut, extremities furnished with a more or less conspicuous callus, teeth strong. Length, 1·2–1·4 inches.

I. St. Vincent, W. I.

C. ingloria, Crosse (fig. 4), credited to Africa, is a rather more inflated variety, with extremities not quite so produced, and margins less pitted, but the general coloring of the shell is similar.

The var. *Aubreyana*, Jouss. (fig. 7), is larger and still more

inflated, the colors are paler, there is an absence of the pittings, and a partial obliteration of the callosities. Length, 1·9 inches. By an error of the printer, the illustration of *C. ingloria* is marked ⅔ natural size—these figures should have been placed beside *C. Aubreyana.*

C. HELVOLA, Linn. Pl. 19, figs. 8, 9.

Pale bluish or olive-brown, ornamented with white and brown spots, sides and base saffron-red, color darker above the edge; extremities violet; teeth strong, partially elongated across the base. Length, ·55–1·1 inches.

Indian and Pacific Oceans.

Specimens from Mauritius are very deep in color, and the extremities are rich purple, while those from the Sandwich Islands are often pale yellow, faintly spotted, with a whitish base and extremities. Young shell pale bluish, faintly banded, teeth brownish.

C. CITRINA, Gray. Pl. 19, figs. 10, 11.

Differs from *C. helvola* in its more delicate coloring; the dorsal surface is uniformly olive-brown, and the extremities are deep orange; teeth fine, numerous. Length, ·75–1 inch.

Ceylon; Mauritius; N. W. Australia (Bailey).

C. POLITA, Roberts. Pl. 19, figs. 12, 13.

Creamy white, thickly covered with minute white spots, pittings orange, particularly those on the extremities; base ivory-white, teeth small, more or less tinted with yellowish, those on the columellar side confined to the aperture, except for a short distance from each end. Length, ·55–1 inch.

Sandwich Islands.

Younger shell, bright citron; when the last coating of enamel is being deposited it has a half clouded appearance. Closely allied to the following.

C. SEMIPLOTA, Mighels. Pl. 19, figs. 37, 36, 31.

Light brown with numerous minute white spots; base tumid, white, aperture yellowish, narrow. Length, ·3–·4 inch.

Oahu.

Mr. Mighels described the immature shell as *C. spadix* (fig. 36). *C. Annæ*, Roberts (fig. 31), is a broad flattened variety,

rather more solid, and of a grayish white color. A little shell figured by Sowerby in Thes. Conch., as *C. fimbriatula*, appears to be a fair illustration of *C. semiplota*.

C. THOMASI, Crosse. Pl. 19, figs. 14, 15.

Yellowish brown, spotted whitish and brownish, base white; teeth small, those on the columella rather obscure.

Length, ·7 inch.

Hab.?

C. SPURCA, Linn. Pl. 19, figs. 16, 17.

Dirty white, clouded and spotted with yellowish brown, pits brown, base white to pale yellowish brown; teeth strong.

Length, ·75–1·25 inches.

Mediterranean Sea, E. Atlantic O.

Fossil in the Pleistocene. This species is reported as occurring in Australia, but specimens sent to Philadelphia so labeled, proved to be *C. flaveola*, Linn., and *C. cernica*, Sowb.

C. FLAVEOLA, Linn. Pl. 19, figs. 22, 20, 21.

Yellowish brown, profusely ornamented with white spots of various sizes, which sometimes have a bluish cast; margins stained and dotted with blackish brown, base white, teeth somewhat elongated. Length, ·8–1·2 inches.

Japan, Australia.

The variety *labrolineata*, Gask., is of a pale stone-color, with teeth smaller and more numerous. No illustration of this variety having been given, and not having had the privilege of seeing specimens of *C. flaveola* at the time, I was led into the error of describing it as *C. Helenæ* (figs. 20, 21).

C. CERNICA, Sowb. Pl. 19, figs. 23, 24.

Yellow, dorsal spots white, numerous, those on the margins reddish-brown, extending around the extremities, which, together with the base, are white; outer teeth strong. Length, ·75–1 inch.

Mauritius.

Closely allied to *C. flaveola*, Linn.

C. GANGRANOSA, Soland. Pl. 19, figs. 18, 19, 25–28.

Differs from *C. flaveola*, Linn., in having in addition to the white dorsal spots, which are very small, occasional brown eyes

sprinkled over the surface; the marginal spots are nearly obsolete, and the under side of both extremities is stained orange.

Length, ·6–1 inch.

Ceylon, China.

C. Boivini, Kiener (figs. 25, 26), is a milky-white variety with white extremities, usually presenting a worn appearance. *C. Reentsi*, Dunker (figs. 27, 28), is another form with the dorsal surface lined transversely, and the extremities spotted with reddish-brown; it looks like a young shell.

Group C. (*Gaskoinia, Roberts.*) *Shell smooth, edentulate.*

C. EDENTULA, Sowb. Pl. 19, figs. 29, 30.

Shorter and more inflated than *C. Algoensis*, from which it is distinguished by the absence of teeth. Length, 1 inch.

Southern Africa.

Group D. (*Cypræovula, Gray.*) *Shell ribbed transversely.*

C. ADAMSONI, Gray. Pl. 19, figs. 32, 33.

White, conspicuously blotched with orange-brown.

Length, ·5–·7 inch.

Philippines, I. Bourbon.

C. CAPENSIS, Gray. Pl. 19, figs. 34, 35.

Yellowish or reddish brown, deeply umbilicated, the ridges extend over the base of the shell. Length, 1–1·4 inches.

Cape of Good Hope.

Group E. (*Pustularia, Swn.*) *Shell pustulate or nodulous.*

C. STAPHYLÆA, Linn. Pl. 20, figs. 39–44.

Grayish to brownish, pustules whitish, small, numerous; extremities tipped with reddish brown, base dirty white to brown, teeth extended across the base on each side.

Length, ·5–·9 inch.

Indian and Pacific Oceans.

Young shell usually brown, without pustules. *C. interstincta*, Wood (figs. 42, 43, 44), is a whitish or brownish variety with larger and less numerous pustules, which are sometimes partially obsolete, the teeth are coarser, darker in color, and do not always extend entirely across the base.

In his description of *C. limacina*, Lamarck refers to two figures, the one from Lister being a well-marked *C. staphylæa*, while the other corresponds to *C. interstincta*.

C. PUSTULATA, Lam. Pl. 20, fig. 45, 46, 52.

Lead-color, covered with transverse striæ, and armed with numerous prominent reddish pimples, those in the middle being the largest; base chocolate, teeth extending across the base in conspicuous ridges, ribs whitish. Length, ·5–·9 inch.

Panama, *Mazatlan.*

Younger shell (fig. 52) with the back cancellated but destitute of pimples, which do not appear until the teeth have become considerably developed.

C. NUCLEUS, Linn. Pl. 20, figs. 48, 49.

Whitish, nodules dull brown, the lateral ones united together by fine ridges. Length, ·55–·75 inch.

Indian and Pacific Oceans.

C. MADAGASCARIENSIS, Gmel. Pl. 20, figs. 65, 66; Pl. 19, fig. 38.

Larger and much more depressed than the preceding, pustules larger and less numerous; the ridges on the outer lip are alternately larger and smaller. Length, 1–1·3 inches.

Madagascar; Sandwich Is. (Pease).

C. granulata, Pease (Pl. 19, fig. 38) is a younger example of this species; in it, the basal ridges are fewer, and do not extend to the margin, but usually become obsolete as they approach it; in some specimens the dorsal ridges are also wanting.

Section IV. (*Epona*, *H. and A. Ad.*) *Shell globose, back either smooth or with elevated tubercles, extremities produced.*

C. ANNULATA, Gray. Pl. 20, figs. 50, 51.

Ivory-white, smooth, irregularly painted with round yellow spots, encircled with rings of a deeper tint, teeth very minute, base white. Length, ·6 inch.

Mauritius, *Philippines.*

C. CICERCULA, Linn. Pl. 20, figs. 55–58, 61, 62.

Yellowish, granulose, irregularly blotched with brown, sides

dotted with brown, base conspicuously painted with four chestnut spots, teeth usually elongated across the base.

Length, ·5–·9 inch.

Mauritius, *Borneo*, *New Caledonia*.

This species sometimes presents an unusually humped appearance, the basal spots being often obsolete and the extremities greatly produced; such shells are mostly whitish and strongly granulose, with the dorsal line well marked.

I can see no reason for separating either *C. Lienardi* (figs. 57, 58), or *C. tricornis* (figs. 61, 62), both of which were described by Dr. Jousseaume; a careful examination of specimens of these received from Mauritius, showing scarcely a varietal difference.

Dr. Jousseaume himself admits that *Lienardi* is the veritable *cicercula*.

C. GLOBULUS, Linn. Pl. 20, figs. 59, 60.

Very closely allied to *C. cicercula;* the main difference lies in its more oblong form; the dorsal line is absent, as are also the granulations and the chestnut spots. Length, ·8 inch.

Mauritius, *Borneo*, *New Caledonia*.

I believe future investigation will prove the identity of this with *C. cicercula*.

C. CHILDRENI, Gray. Pl. 20, figs. 53, 54.

Pale yellowish brown, transversely ribbed throughout, ribs a shade darker, extremities carinately winged beneath, teeth minute. Length, ·5–·6 inch.

Annaa I., *Borneo*, *New Caledonia*.

This is the only species at present known possessing the peculiar winged projections at the base of the extremities.

Subgenus TRIVIA, Gray.

Shell subglobular, cross-ribbed, front of columella internally concave, ribbed.

Group A. Shell generally thin, aperture wide, outer lip narrow, margined.

T. ONISCUS, Lam. Pl. 21, figs. 67, 68.

Brownish or pinkish flesh-color, base whitish, ribs bifurcated or wrinkled, dorsal line broad, smooth, flat.

Length, ·75–·9 inch. *Cape of Good Hope.*

T. OVULATA, Lam. Pl. 21, figs. 69, 70.

Differs from the preceding in being smooth throughout; the teeth on the inner lip are very small. Length, ·7–·9 inch.

Cape of Good Hope.

T. COSTATA, Gmel. Pl. 21, figs. 71, 72.

Differs from *C. oniscus* in having rather finer ribs, and in the absence of a dorsal impression. Length, ·6–·7 inch.

West Indies (Krebs), *Cape of Good Hope* (?)

This species was described by Gray as *T. carnea*, and by Wood as *C. rosea.*

T. VESICULARIS, Gask. Pl. 21, figs. 73, 74.

Much smaller than *C. oniscus*, dorsal striæ finer, more numerous and regular; no dorsal impression. Length, ·5 inch.

Cape of Good Hope.

Group B. Shell thick, usually margined, aperture narrow and more or less central.

a. Having a dorsal impression.

* *Shell white.*

T. SULCATA, Gask. Pl. 21, figs. 75, 76.

Ventricose, ribs coarse, prominent, spire perceptible, inner lip ending posteriorly in a sharp edge. Length, ·45 inch.

Manilla.

T. CICATROSA, Sowb. Pl. 21, figs. 77, 78.

Subglobose, outer lip expanded posteriorly, dorsal impression short and very deep. Length, ·3 inch.

Hab. (?)

T. NIVEA, Gray. Pl. 21, figs. 80, 81.

Globose, extremities very obtuse, ribs narrow, wrinkled. Length, ·35–·45 inch.

West Indies.

There has been some confusion regarding this species, caused partly by the name "*nivea*" having been first given by Dr. Gray to a shell which was afterwards recognized as a white variety of *C. turdus.* Later he adopted the same name from Solander MSS. for what the eminent conchologist Gaskoin, as well as myself, believed to be Lamarck's *oryza;* but the characters given, and

the different distribution are sufficient to separate the two, and I follow later monographers by adopting *T. nivea.*

This species is the *T. scabriuscula*, Kien., not Gray.

T. ORYZA, Lam. Pl. 21, figs. 82, 83, 79.

Ovate, extremities produced, ribs fine, dorsal impression long. Length, ·30–·45 inch.

Sandwich Is., *Australia*, *Philippines.*

Dr. Dunker in "Mal. Blatt." for 1861, refers to a small variety from the Red Sea, having only a faint dorsal sulcus.

T. scabriuscula, Gray (fig. 79) is a variety characterized by rather more produced rostrated extremities and a shorter dorsal impression.

T. oryza is as peculiarly East Indian as *T. nivea* is West Indian.

T. GRANDO, Gask. Pl. 21, figs. 86, 87.

Smaller and more globose than the preceding, ribs extremely fine and delicate, aperture rather wide, spire prominent.

Length, ·26 inch.

Manilla.

T. INSECTA, Mighels. Pl. 21, figs. 84, 85.

Elongate ovate, subrostrate, ribs very fine, back depressed, dorsal sulcus long. Length, ·1–·2 inch.

Sandwich Islands, *Australia.*

Kiener called this species *C. hordacea.*

T. VITREA, Gask. Pl. 21, figs. 88, 89.

Globose, aperture rather narrow, and slightly curved inwards, ribs coarse, texture pellucid. Length, ·25 inch.

Philippines.

Weinkauff thinks this species and *T. sulcata* belong together.

T. GLOBOSA, Gray. Pl. 21, figs. 92, 93.

Round like a pea, aperture very narrow, dorsal impression sharply cut and reaching to the extremities. Length, ·1–·2 inch.

West Indies; Sandwich Is.; Australia.

Described by Kiener as *T. pilula* and by Mighels as *T. sphærula.*

Weinkauff separates *T. pilula*, giving this name to the shell

from the Pacific region, and retains *T. globosa* for the West Indian form, but I have not been able to separate the two.

T. subrostrata, var. *alba*, Krebs, is most likely *T. globosa;* the two species are very similar in form.

T. PAUCILIRATA, Sowb. Pl. 21, figs 98, 99.

Ovate, ribs coarse, dorsal impression conspicuous.
Length, ·25 inch. *Hab.* (?)

** *Shell usually pinkish, spotted.*

T. PEDICULUS, Linn. Pl. 21, figs. 94–97.

Fleshy white marbled with pale brown, especially towards the sides, margin ridged, dorsal spots black, ribs coarse, nodular, interior of columella white. Length, ·25–·65 inch.

Florida, West Indies.

A species presenting considerable variation.

T. labiosa, Gask. (fig. 97), is a variety in which the marginal ridge is exaggerated; the ribs are fewer in number and of a whitish color, while in *T. cimex*, H. Owen (fig. 96), there is an increased tendency to crenulation in the dorsal ribs, and an amalgamation of the dark spots on the right side into one blotch.

Fossil, *T. pediculus* occurs in the Pliocene clay beds of Costa Rica (W. M. Gabb).

T. SUFFUSA, Gray. Pl. 21, figs. 1, 2, 100.

Oblong ovate, ribs fine, promiscuously variegated and sprinkled with brown, extremities pink, base whitish. Length, ·3–·5 inch.

West Indies.

Described by Duclos, under the name *T. Armandina.*

T. pullata, H. Owen (fig. 100), presents the peculiarity of the spots being amalgamated into a single tint.

T. PACIFICA, Gray. Pl. 21, figs. 3, 4.

More attenuated than the preceding, with more produced extremities; the ribs are finer and the dorsal spots alternate on each side of the sulcus. Length, ·3–·4 inch.

Gulf of California (Stearns), *Acapulco, Galapagos Is.*

T. QUADRIPUNCTATA, Gray. Pl. 22, figs. 5, 6.

Rotundly ovate, back ornamented with four conspicuous red

dots, two on each side of the dorsal groove, alternating one with the other; ribs fine. Length, ·20–·35 inch.

The *T. rotunda*, Kiener. *West Indies, Florida.*

T. EXIGUA, Gray. Pl. 22, figs. 9, 10, 17.

Ovate, extremities produced, beaked, white, stained and variegated with bright rose, ribs fine. Length, ·15–·2 inch.

Sandwich Islands, New Caledonia.

A most beautiful little shell, described also by Duclos, as *T. tremeza*, and by Dr. Gould, as *T. gemmula.*

T. corrugata, Pease (fig. 17), differs in having fewer and stronger ribs; the pink color is not so persistent, some of the specimens being pure white.

*** *Shell brownish.*

T. RADIANS, Lam. Pl. 22, figs. 13, 14, 11, 12.

Rotundly ovate, sides dilated, dorsal impression broad, nodose on each side, the ribs diverging from the nodules, back stained with a dark blotch, base depressed. Length, ·65–·8 inch.

Lower California, Ecuador.

T. rota, Weinkauff (figs. 11, 12), is a distant variety with a color more diffused and nearer *T. Solandri.*

T. SOLANDRI, Gray. Pl. 22, figs. 15, 16.

More rounded at the base than the preceding, from which it can be easily distinguished by its minute row of outer teeth, there being an intermediate one between each of those terminating the ribs. Length, ·55–·80 inch.

Santa Barbara, Cal.—Acapulco.

T. COSTIS-PUNCTATA, Gask. Pl. 22, figs. 7, 8.

Closely allied to *T. radians.* Its color is that of the ordinary *T. pediculus*, the ribs are spotted, and the dorsal groove is narrow, the base is rounded. Length, ·6 inch. *Hab.* (?)

T. CALIFORNICA, Gray. Pl. 22, figs. 18, 19, 20, 37.

Ovate, rather globose; ribs distant, dorsal impression faint, whitish; teeth whitish. Length, ·35–·55 inch. *California.*

The animal is vivid orange-scarlet, reddish brown at the end of the proboscis. When the mantle is extended over the back of the shell its color is neutralized by the purple of the latter. *T. depauperata*, Sowb. (fig. 37), was described from a worn specimen.

T. MAUGERI, Gray. Pl. 22, figs. 23, 24.

Pyriformly ovate, fulvous rose-color, closely ribbed, ribs somewhat flexuose, dorsal line narrow, back obscurely stained with a large faint brown blotch, right side pink.

Length, about ·7 inch.

Galapagos Is.

T. PISUM, Gask. Pl. 22, figs. 29, 30.

Spheroidal, light fawn, ribs large, prominent; aperture rather wide, extremities slightly produced, dorsal impression long.

Length, about ·45 inch.

Ceylon.

T. SANGUINEA, Gray. Pl. 22, figs. 21, 22.

Ovate, purple-brown, back stained in the middle with a blood-red spot, whitish at each end, ribs whitish, dorsal impression almost obsolete. Length, ·35–·5 inch.

California—Ecuador.

Described by Dufresne as *T. lathyrus.*

T. FUSCA, Gray. Pl. 22, figs. 35, 36.

Smaller, narrower and more produced than the preceding, ribs finer and of the same color as the shell.

Length, ·15–·30 inch. *Galapagos Is.*

T. SUBROSTRATA, Gray. Pl. 22, figs. 38, 39.

Globose, dark chocolate-brown, extremities slightly beaked, dorsal line well marked. Length, ·15–·3 inch.

West Indies.

Locality given in Mazatlan Catalogue by Dr. Carpenter is improbable. As before stated, the white variety of this species mentioned in Krebs' Catalogue is most likely *T. globosa*, Gray.

b. Having no dorsal impression.

* *Shell white.*

T. CANDIDULA, Gask. Pl. 22, figs. 33, 34.

Globosely ovate, ribs strong, rather conspicuous.

Length, ·25 inch.

Canary Is., Azores, Spanish Coast (Hidalgo), *Mexico.*

Credited also to several Pacific localities, the correctness of which is somewhat doubtful.

This species was almost simultaneously described by Duclos as *T. olorina*, and by Beck as *T. approximans.*

T. PRODUCTA, Gask. Pl. 22, figs. 25, 26.

Ovate, sides a little dilated, extremities peculiarly produced, ribs fine. Length, ·5 inch.

Borneo; Agulhas Bank, S. Africa; Australia.

T. PELLUCIDULA, Gask. Pl. 22, figs. 31, 32.

Ovate, extremities produced, ribs very fine, aperture narrow and nearly straight. Length, ·18–·3 inch.

Pacific Ocean.

T. BREVISSIMA, Sowb. Pl. 21, figs. 90, 91.

Differs from *T. globosa*, which it closely resembles, in having no dorsal impression. Length, ·2 inch.

Hab. (?)

** *Shell pinkish, sometimes spotted.*

T. RUBINICOLOR, Gask. Pl. 22, figs. 27, 28.

Ovate, extremities obtusely produced and tinged rose-red, ribs fine. Length, ·25–·4 inch.

Ceylon, Borneo.

T. AFFINIS, Marrat. Pl. 23, figs. 40, 41.

Oblong-ovate, pale, with indications of color, extremities produced, broad, ribs rather coarse. Length, ·3 inch.

Hab. (?)

The type specimens were found in a dealer's stock of West Indian shells, but as no collectors have reported it from that locality, and as the shell closely resembles *T. Pacifica*, except in the absence of any dorsal impression, I am inclined to think it belongs to a Pacific fauna.

T. RUBESCENS, Gray. Pl. 23, figs. 42, 43.

Globosely ovate, pale pinkish or reddish, ribs fine. Length, ·3–·4 inch.

Galapagos I.

Somewhat of the form of *T. candidula*, Gask.

T. FORMOSA, Gask. Pl. 23, figs. 44–47.

Globose, thin, rather inflated; whitish, delicately suffused with rose, ribs and teeth numerous, fine. Length, about ·5 inch.

Cape of Good Hope.

T. multilirata, Sowb. (figs. 46, 47), credited to the Adriatic,

the author says was first figured for *T. formosa*. It resembles a more adult shell than our illustration of the latter, copied from Thes. Conch., and is quite likely the same.

Dr. Weinkauff believes *T. formosa* to be close to *T. Europæa*, Mont., if not identical.

T. Europæa, Montagu. Pl. 23, figs. 48–51.

Ovate, flesh-color, tinged with fulvous, sparingly spotted with brown, closely ribbed, base white. Length, ·3–·5 inch.

Mediterranean Sea to *Norway*.

Found fossil to the Miocene, it being common in the Red Crag.

The fossil form was described as *T. sphæriculata* by Lam., and *T. coccinelloides* by Sowb.

While the shell of *T. Europæa* is plain, the animal presents a striking contrast, it being predominantly yellow, brown and pink; the mantle is very large and more or less studded with wart-like processes of a pale orange-brown with white or yellow papillæ, occasionally variegated by red spots and a few purplish blotches.

It is found on stony and coral ground from low-water mark to 100 fathoms.

According to Dr. J. Gwyn Jeffreys, the northern specimens are usually unspotted, while those found south are smaller and more frequently spotted.

T. arctica, Montagu, is the unspotted form; *T. bullata*, of the same author, represents the young shell (fig. 50). *Bulla diaphana*, Montagu (fig. 51), is a very young example of the same; so is the *Bulla candida*, Macgillivray. The species was also described by Lamarck as *T. coccinella*, and by Sars as *T. Norvegica*, while Risso gave it the name *T. Mediterranea*.

The late Chas. Kingsley, Canon of Westminster, in a letter to his friend H. P. Gosse, January 3d, 1854, says: "I have seen *T. Europæa* during the last few days suspend itself from the under side of low-tide rocks by a glutinous thread an inch or more in length, and when in captivity float on the surface by means of a similar thread attached to a glutinous bubble."—(Life of Chas. Kingsley.)

T. NAPOLINA, Duclos. Pl. 23, fig. 52.

Much narrower and more produced than the preceding, its ribs are rather finer and more convergent; its color is a dingy white, and it has only two spots, one at each end of the dorsum.

Length, ·35–·45 inch.

Senegal, N. W. Australia.

Credited also to St. Vincent, Cape Verd, by M. de Cessac. Described by Gaskoin as *T. obscura.*

T. AUSTRALIS, Lam. Pl. 23, figs. 53, 54.

Oblong-ovate, rather thin, irregularly painted with light brown blotches, ribs fine, nearly obsolete on the back, extremities tinted with rose, base white. Length, ·4–·75 inch.

New South Wales.

Common at this locality, living in from 10 to 15 fms.

*** *Shell brown.*

T. PULEX, Soland. Pl. 23, figs. 55, 56.

Ovate, ribs fine, smooth or obsolete on the back, sides and base white. Length, ·3 inch.

Azores, Mediterranean Sea.

Fossil in the Pleistocene.

T. PULLA, Gask. Pl. 23, figs. 57, 58.

Ovate, extremities slightly produced, ribs fine.

Length, ·25 inch.

Galapagos Is., Gulf of California (Stearns).

Is probably the Trivia mentioned in the Mazatlan Catalogue as being *T. subrostrata.*

Unidentified Species of Cypræidæ.

C. CAPUT-ANGUIS, Philippi.

An unfigured species without known locality, less than one-half inch in length, brown between the teeth, and white-spotted at the extremities. Said to present a dorsal surface similar to *C. caput-serpentis*, Linn., which has led authors to incorrectly place it in the synonomy of that species.

C. PARVULA, Philippi.

Another unfigured species, locality unknown; said to belong to the group containing *C. fimbriata*, Gmel.

C. CASTANEA, Anderson.

Shell ovate, ventricose, chestnut-brown, with two wide obscure bands, margins thickened, white spotted with brown, aperture at extremities rosy red.

Hab.?

C. TRIGONELLA, Dufr.

Shell oval, a little inflated, aperture narrow, dorsal surface crimson-reddish, margin white, spotted with blackish brown.

New Holland.

TRIVIA ACUTIDENTATA, Gask.

Ovate globular, dull white with a faint dorsal impression, ribs rather thick, prominent but not crowded, columellar side more gibbous than the outer, teeth more numerous on the lip than on the columella.

Bay of Guayaquil.

Its nearest ally in shape is *T. exigua.*

The original type of this species was accidentally broken by Mr. Gaskoin after description, and the fragments preserved in the collection of Miss Saul are too incomplete for recognition.

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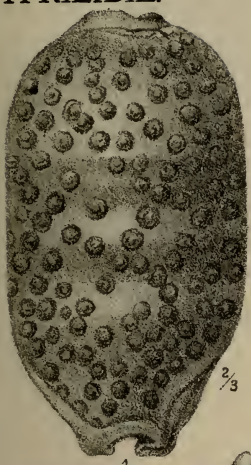

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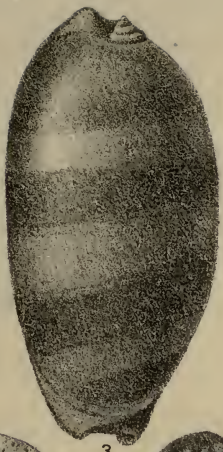

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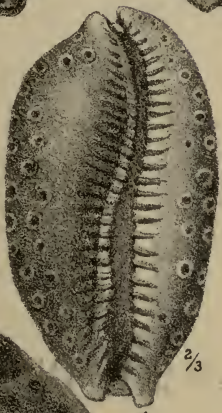

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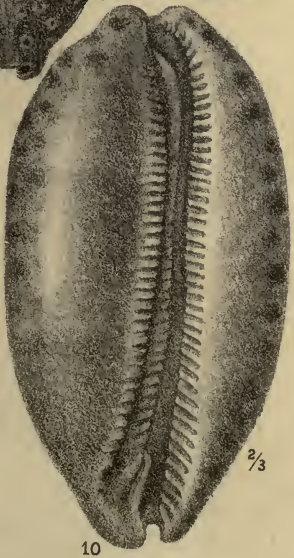

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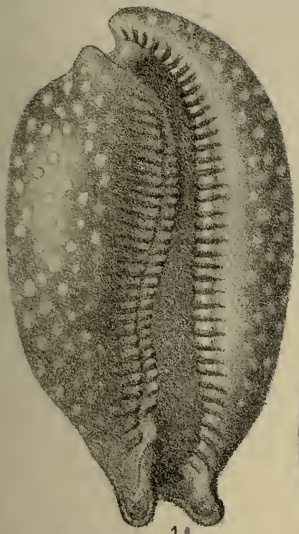
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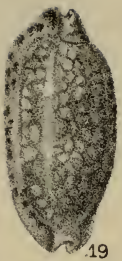
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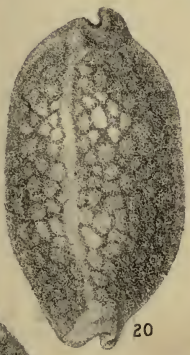
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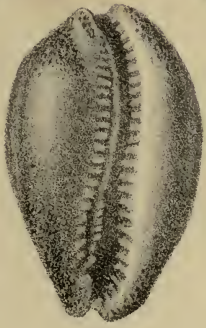
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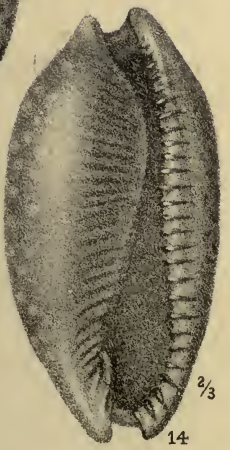

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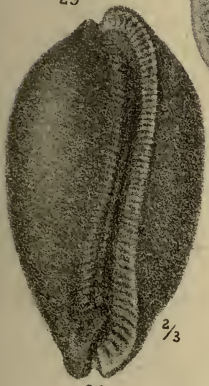
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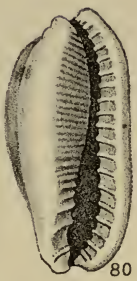
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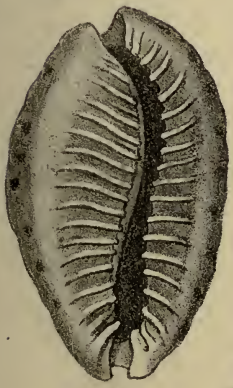
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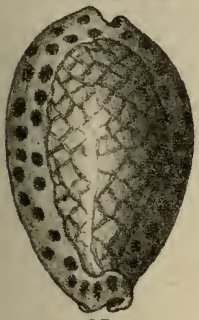
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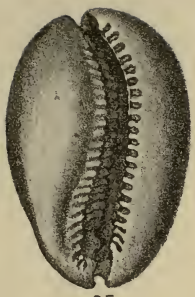
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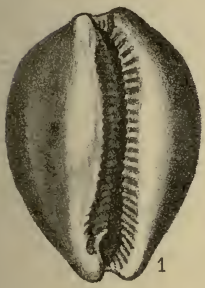
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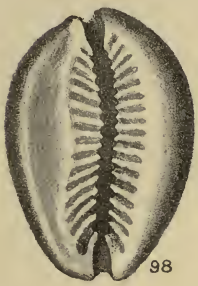
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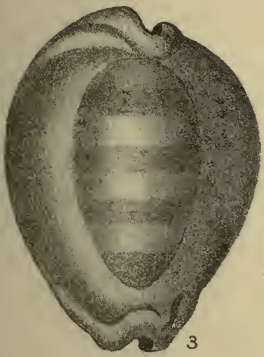
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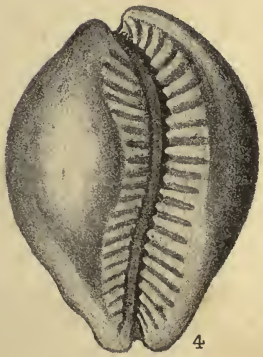
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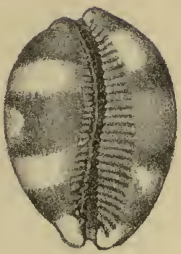
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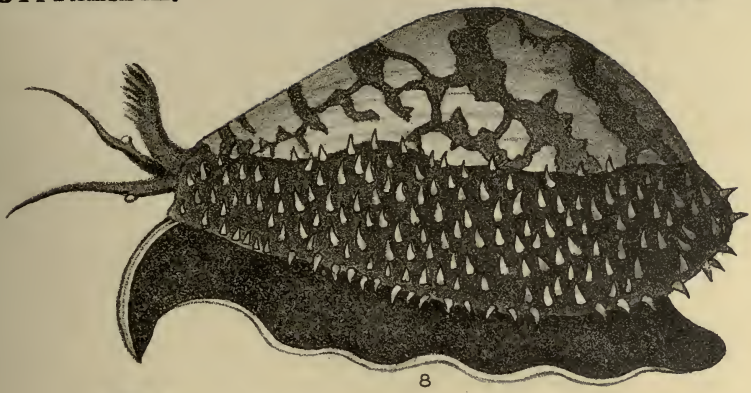

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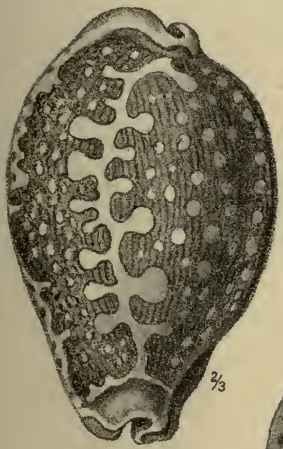

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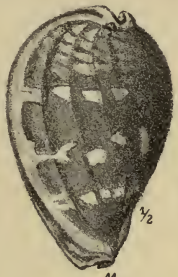

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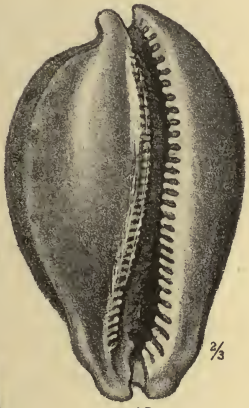

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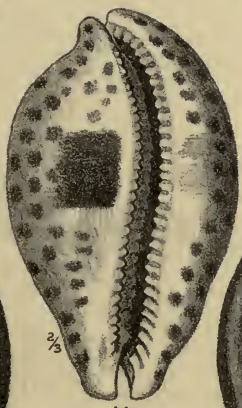

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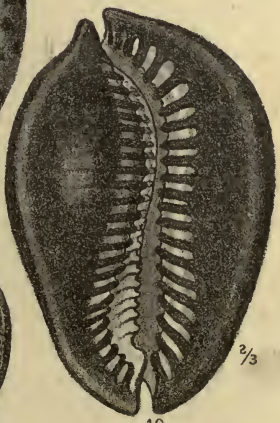

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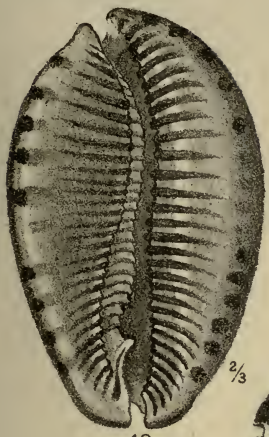

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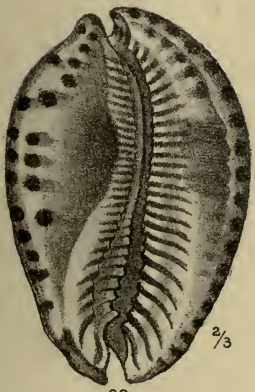

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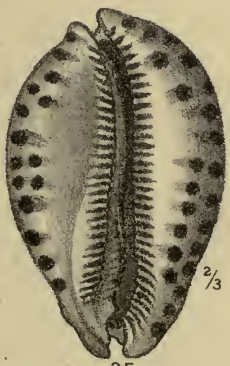

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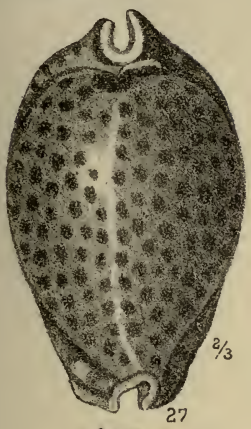

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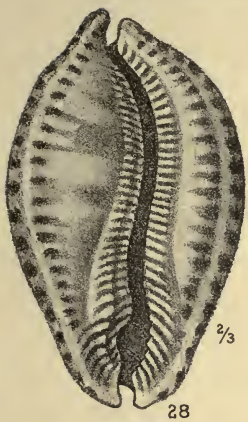

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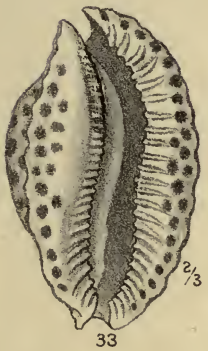

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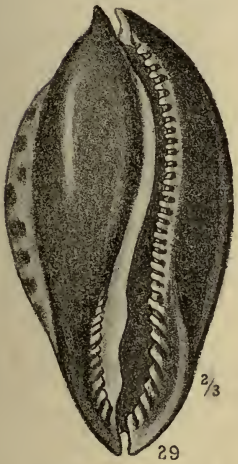

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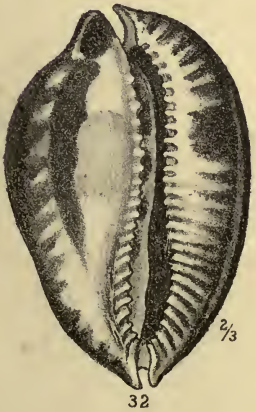

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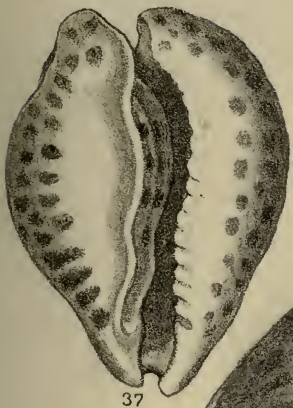

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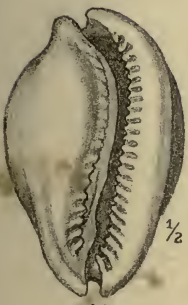

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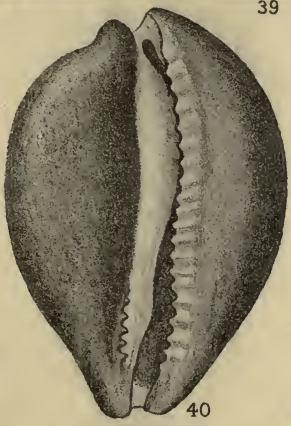

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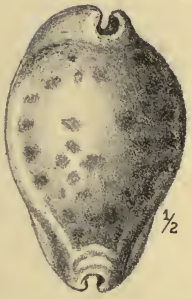

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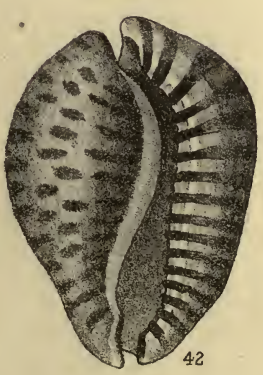

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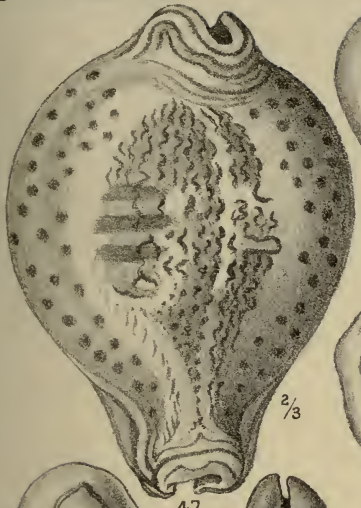

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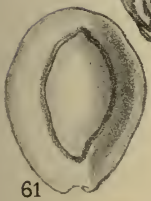

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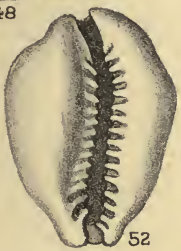

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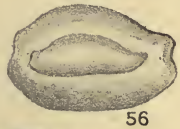

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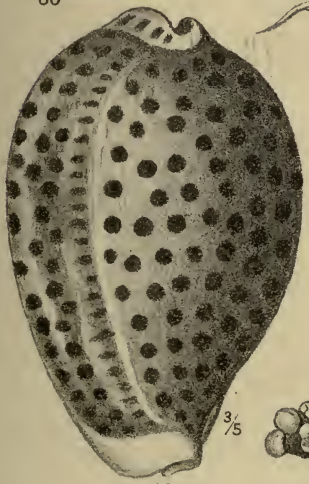

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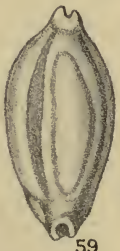

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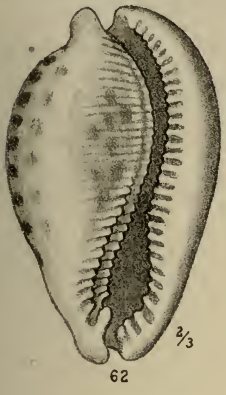

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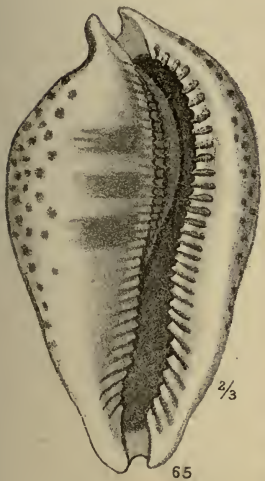

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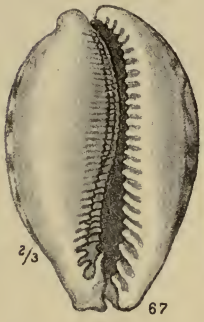

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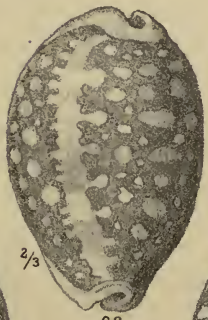

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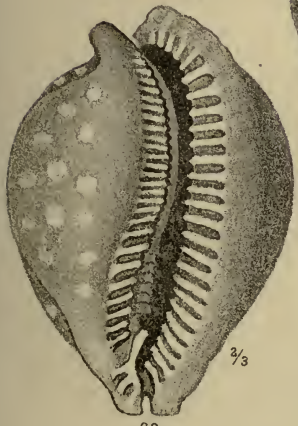

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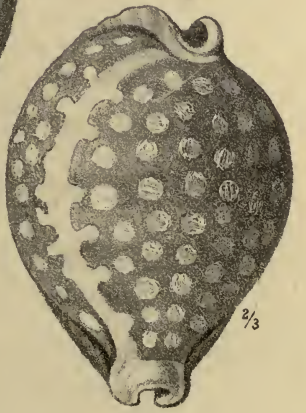

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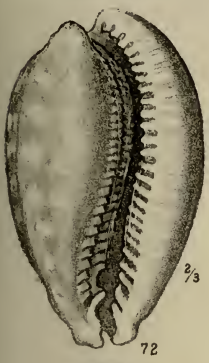
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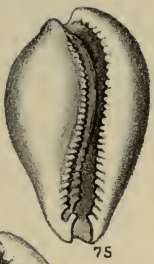
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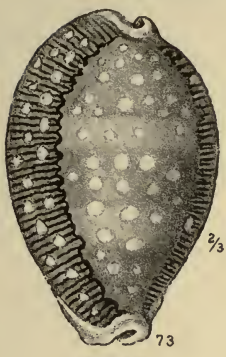
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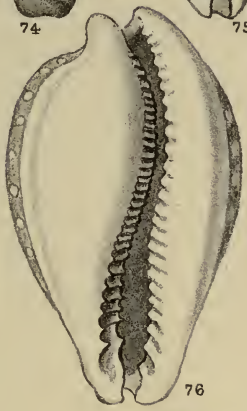
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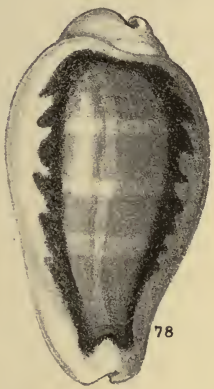
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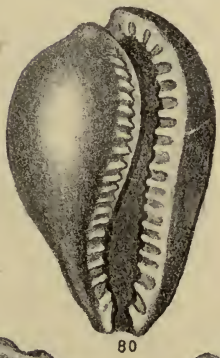
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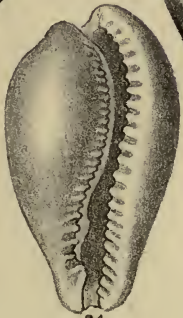
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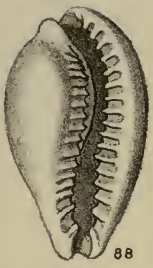
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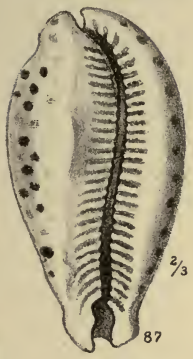
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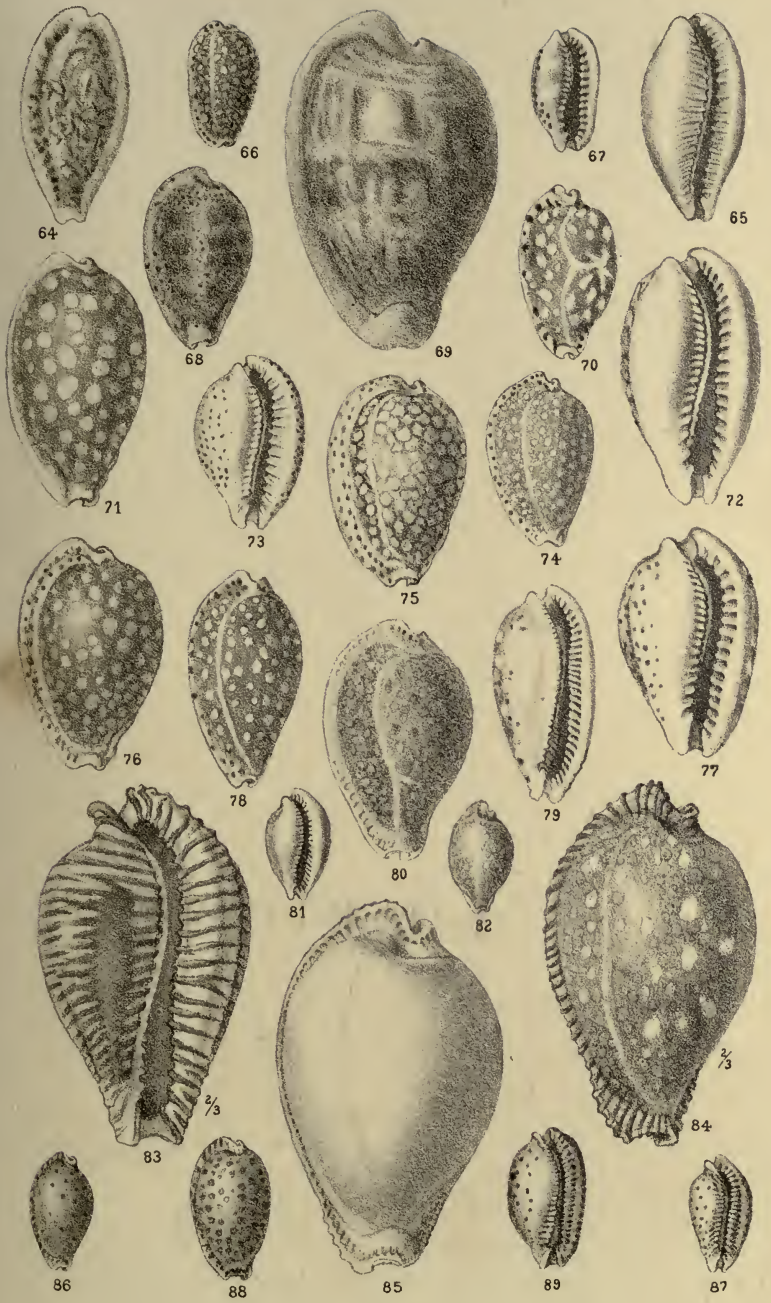
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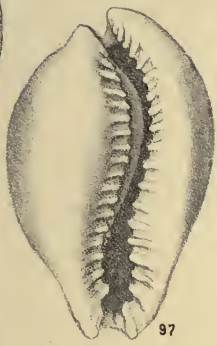
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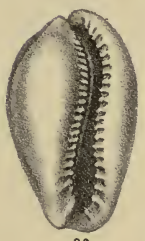
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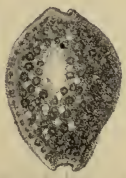
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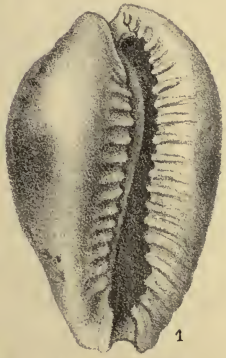
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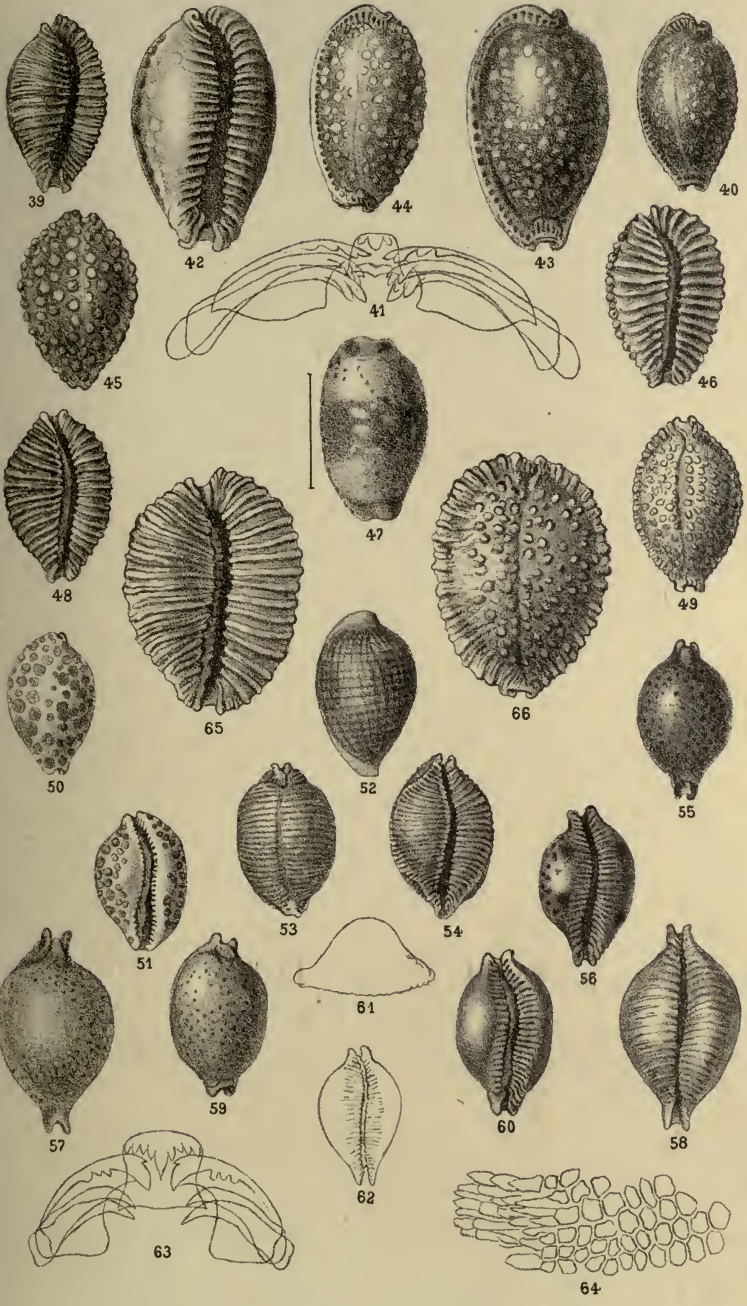
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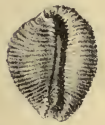
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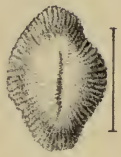
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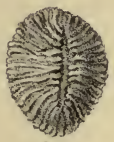
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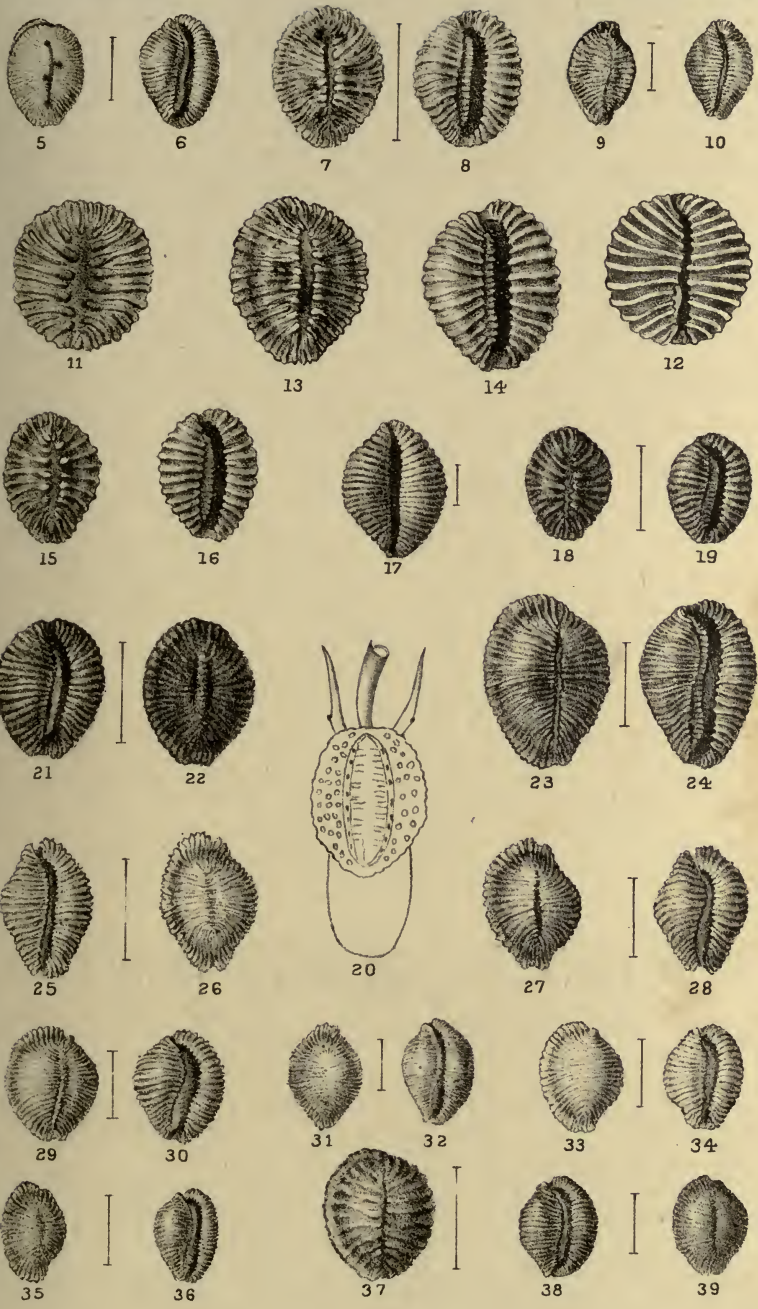
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Family *PEDICULARIIDÆ.*

Shell small, limpet-like, irregular, with a short spire which becomes concealed with the growth, the surface radiately ribbed when young; mouth large and wide, subcanaliculated in front, the lips irregular, simple in the adult, the inner one callously excavated, no operculum.

Animal with small foot, mantle-margin thickened, not reflected over the shell, siphon not produced, eyes sessile at the external base of the tentacles. Dentition 3·1·3, the central tooth subquadrangular, multicuspidate, the laterals transverse, multicuspidate, the marginals long and narrow, with three profound digitations; exterior to the marginals is a small supplementary plate (Pl. 1, fig. 1).

Young shells have the regular form of Trivia (to which the dentition approximates), with a plicate columella and dentate lip, but its parasitic habits (on polyps) cause subsequent irregular growth, so that its relationships were for a long period very uncertain. The dentition fixes its place between Cypræidæ and Ovulidæ.

Genus PEDICULARIA, Swainson, 1840.

Characters, those of the family. Very few species are known, but the geographical range of the genus is world-wide in warm seas. Fossil, miocene of Sicily.

The subgenus *Dentiora*, Pease, 1862, which is founded on a shell three and a half millimetres in length, is probably a juvenile Pedicularia; it is said to be ovate, with subinflected lip, which is lirate, the columella plane or excavated, ridged above, compressed below and sharply dentate, the outer surface spirally subgranosely striated. *Thyreus*, Phil., is a synonym of Pedicularia.

Family *PEDICULARIIDÆ.*

Genus PEDICULARIA, Swainson, 1840.

P. Sicula, Swainson. Pl. 1, figs. 2, 3.

Adult irregular, more or less compressed at the sides, having a limpet-like appearance, and modified as to outline by the surface upon which it lives; the spiral lines of the young shell

are usually persistent on a portion of the back of the adult; whitish, tinged with brown within. Length, 10 mill.

Sicily, *Isle of Hyeres*, *France*; on polyps.

Thyreus paradoxus, Phil., and probably *Gadinia lateralis*, Requien, are synonyms.

P. Californica, Newcomb. Pl. 1, fig. 4.

Depressly globose, crimson-colored, minutely transversely striated, above rounded, below broadly rounded; lip expanded, semicircular; columella thick, dilated within, straight; aperture elongately subovate; extremities broadly notched.

Length, 10 mill. *Southern California*, on coral.

P. Japonica, Dall. Pl. 1, fig. 5.

Elongated, sinuated; whitish, irregularly suffused with rose-pink, apex yellowish pink, interior darker, livid pink; externally rather coarsely grooved and striated; apex somewhat mammillated, vertex umbilicated; columella straight, inconspicuous; lateral margins much produced, concave, effuse, extremities narrow, canaliculate. Length, ·5 inch.

Niphon, *Japan*, 60 fms., on Gorgonia.

Is more coarsely striate than *P. Pacifica*, and umbilicated, also differing in color. *P. Californica* is shorter and more globose, with a thicker columella.

P. Pacifica, Pease. Pl. 1, figs. 6, 7.

Rather solid, oblong, much contracted in the middle, irregular in shape; radiately ornamented with elevated granulose striæ, decussated by concentric striæ; apex straight, involute, immersed; wholly of either reddish, violet, purple or yellowish color. Length, 8 mill. *Ins. Apaian.*

Smaller than the next species, the apex oblique and not contracted in the middle.

P. elegantissima, Desh. Pl. 1, figs. 8, 9.

Ovate oblong, very convex on the back, elegantly transversely striate, apex umbilicate; vivid violaceous. Length, 6 mill.

Isle of Bourbon, *Mauritius.*

P. Lienardi, Robillard, is a synonym.

P. decussata, Gould. (Unfigured). *Off Coast of Georgia.*

P. albida, Dall. (Unfigured). *West Indies.*

P. (Dentiora) rubida, Pease. (Unfigured). *Sandwich Islands.*

Family *OVULIDÆ*.

Shell related closely to the Cypræidæ in general form, but differing in being involute in all stages of growth, whilst the Cowries exhibit a short spire when young, which becomes involute and more or less concealed by the enlargement of the body-whorl with advancing age; there is no epidermis, and the porcellanous surface is usually smooth (sometimes lightly spirally striate), sometimes gibbous, or transversely subcarinated, whitish or not richly colored; extremities more or less beaked, canaliculated or emarginated; aperture the entire length of the shell, rather narrow, the inner lip smooth, the outer lip usually toothed or plicate, sometimes smooth, inflexed. Operculum none. Animal covering the shell with its mantle-lobes after the manner of Cypræa, but the head furnished with a contractile snout rather than a retractile proboscis. Dentition 3·1·3, the central tooth being subtriangular, with several cusps, the laterals falciform, with dentate margin, the marginals subflabelliform with finely pectinated margins (Pl. 1, fig. 10).

Genus OVULA, Bruguiere, 1789.

The characters are those of the family. H. and A. Adams, in their "Genera of Recent Mollusca," have characterized a few genera which it is convenient to retain, giving them the lower rank of subgenera, however, as the main feature distinguishing them is the greater or less extension of the rostrated extremities, a character of somewhat gradual development through the series. The typical group, which Messrs. Adams have distinguished as Amphiperas, Gronov., has a Cypræiform shell, ovoid, ventricose, with but slightly rostrated extremities. The animal has a large foot and the mantle-margin is simple. *O. ovum*, Linn.

There are fifty recent species, distributed throughout the world, in warm latitudes only. A few cretaceous species have been described; all of which, with a single exception (*O. antiquata*, d'Orb., Cret. of India), are either Cypræas or doubtful. The genus is moderately represented in the tertiary.

The genus Simnia, Risso, is characterized by its sharp outer lip, and is still retained by authors, although, as first shown by

myself (Am. Jour. Conch., i, 95), and afterwards confirmed by the late Dr. J. Gwyn Jeffreys and others, the animal, under favorable circumstances, sometimes completes its shell by the addition of a thickened lip, when the distinction from the typical group disappears. Ordinarily Simnia has the sharp lip and it may be considered a case of arrested growth, paralleled by that of *Planorbis trivolvis*—which only in northern waters takes on its expanded lip along with more vigorous growth and larger size.

Subgenus Cyphoma, Bolten, 1798.

Back of shell with a median transverse obtuse ridge, lip smoothish or feebly crenulated. *O. gibbosa*, Linn.

Ultimus, Montfort, and Carinea, Swainson, are synonyms.

Subgenus Volva, Bolten, 1798.

Shell ventricose in the middle, both extremities prolonged into canals, aperture narrow, lip inflected and margined exteriorly, without teeth, no columellar plication.

Mantle-margin with glandular tubercles, foot narrow, folded lengthwise on itself, adapted for creeping on the narrow, rounded branches of gorgoniæ and corals—on which it is supposed to feed.

Birostra, Swains., and Radius, Montf., are synonyms.

Subgenus Neosimnia, Fischer, 1884.

Shell resembling in form the preceding group, but the extremities less prolonged, the columella furnished behind with an oblique callous plication. The habits of the animal appear to be the same as Volva.

? Subgenus Crithe, Gould, 1860.

Shell ovuliform, rostrated at the extremities, aperture narrow, arcuated; outer lip simple, base with transverse ridges passing into the aperture and making teeth on the columellar lip. Animal with a long foot, truncate anteriorly, obtuse posteriorly, tentacles broad, short, triangular, with minute eyes at their exterior base. Described from a single minute species obtained by Stimpson in the China Sea. It is probably a juvenile, and must remain a doubtful group until rediscovered—the types having been destroyed.

Subgenus CALPURNUS, Montfort, 1810.

Shell gibbous, subcarinated across the back, with at either extremity a dorsal tubercle encircled by a groove, outer lip dentate on the margin.

Animal having a large foot, the mantle not tuberculate and covering only a portion of the back of the shell.

Apparently rather closely related to Cypræa, but the dentition being unknown, its definite place remains uncertain.

In addition to the above, the following fossil forms have been described :—

TRANSOVULA, Gregorio, 1880. Shell oval, slightly rostrated, lip denticulated, columellar margin crenulated. *O. Schefferi*, Eocene of Sicily.

DIAMEZA, Deshayes, 1865. Shell elongated, mucronated behind, lip sharp, aperture oblong, hardly narrowed in front. *O. media*, Desh. Eocene, Paris basin. Somewhat resembles Terebellum.

GISORTIA, Jousseaume, 1884. Described as a group of Cypræidæ, but placed doubtfully under Ovula by Fischer. It includes recent as well as Eocene species, and I think its affinities most decidedly with Cypræa, rather than with Ovula.

Several monographs of Ovula have been published :—

L. C. Kiener. Coquilles vivantes, 23 species.
G. B. Sowerby. Thesaurus Conchyliorum, ii, 1855, 48 species.
Lovell Reeve. Conchologia Iconica, 1865, 66 species.
H. C. Weinkauff. In Küster's Conchylien Cabinet, 72 species.

Also catalogues by :—

S. R. Roberts. Am. Jour. Conch., 1865, 72 species.
H. C. Weinkauff. Jahrb. Malak. Gesell.. 1882, 66 species.

The differences between Ovula and Cypræa are carefully indicated in a paper by Prof. Theodore Gill, entitled "On the relations of the Amphiperasidæ," *Am. Jour. Conch.*, vi, 183.

Genus OVULA, Brug., 1789.

Typical Group.

O. OVUM, Linn. Pl. 1, figs. 11, 12.

White, brownish red within the aperture. Length, 2·5–4·5 inches. *East Africa*, *Indian Ocean*, *Japan*, *Society Is.*, etc.

The animal is blackish, the mantle beset with short filaments. It is *O. oviformis*, Lam. (fig. 12) and *O. alba*, Schum. In full dress many of the Pacific Islanders are decked out with large white Ovulum shells, appended to the waist, elbows, and ankles. Throughout the islands inhabited by the crisp-haired Papuan race, a large species of Ovulum of a very pure white color, resembling porcelain, is employed with great effect by the natives in decorating their houses, temples and canoes.—Simmonds, *Commercial Products of the Sea.*

O. TORTILIS, Martyn. Pl. 2, figs. 19, 20.

Smaller and more angularly ventricose than the preceding species; white, the interior of the aperture rose-color.

Length, 2 inches. *Zanzibar*, *Moluccas*, *Friendly Is.*

The synonyms are *O. imperialis*, Dillw.; *O. columba*, Schub. and Wagn.; *O. angulosa*, Lam.; *O. costellata*, Lam.; *O. ovum*, var. β, Gmel.

O. MARGINATA, Sowb. Pl. 1, figs. 13, 14, 15; Pl. 2, figs. 21, 22.

Rather thin, semitransparent, white, encircled with an orange line at the margin, very obscurely decussated, interior milk-white. Length, 21–30 mill. *Hongkong.*

Described without locality. *O. Sinensis*, Sowb. (figs. 21, 22), from Hongkong, appears to be merely a larger shell of the same species. *O. brevis*, Reeve (not Sowerby) and Weinkauff (fig. 15), is probably identical; the back seems to be angulated in this latter species, or else lightly marked with narrow bands.

O. PATULA, Pennant. Pl. 1, figs. 16–18.

White, thin, semitransparent, a little produced at the extremities, with very fine revolving striæ, almost microscopic, lip-margin rarely thickened in English specimens, more usually thickened and slightly dentate in Mediterranean examples; columella with a posterior callous fold when adult.

Length, 1 inch. *Europe.*

Fig. 17 represents the typical *O. patula;* figs. 16, 18, the *O. Adriatica*, Sowb. Additional synonyms are *Bulla virginea*, Cantr., and *O Nicaensis*, Risso.

The typical *O. patula* is the type of the genus Simnia, Risso, a badly characterized group (see p. 243).

O. LACTEA, Lam. Pl. 2, figs. 23–28.

Rather solid, white, back finely transversely ribbed, with several more or less distinct angles. Length, 20–25 mill.

East Africa, *Mauritius*, *Japan*, *Philippines*, *N. Caledonia.*

O. semistriata, Pease (figs. 25, 26), from central Polynesia, appears to be only a variety having the striæ a little stronger, obsolete on the middle of the back. The type is a smaller and more solid shell, but I have before me authentic specimens which are larger, less solid and with the angles of *O. lactea.*

O. cristallina, Kiener (figs. 27, 28), is smaller and narrower than the *O. lactea*, but may be only a variety thereof. The species has not been identified by any author, and the habitat is unknown.

O. PUDICA A. Ad. Pl. 2, figs. 29–31.

Pinkish white, smooth; columella plicate below, callously ridged above. Length, 18 mill.

N. Caledonia.

O. Caledonica, Crosse (fig. 31), appears to be a synonym.

O. NUBECULATA, Ad. and Reeve. Pl. 2, figs. 41, 42.

Pinkish, with three clouded pink-brown bands. Length, 18 mill.

Isl. of Basilan.

May be only a banded variety of the preceding species.

O. PYRIFORMIS, Sowb. Pl. 2, figs. 43–45.

Yellowish white or pinkish, with three clouded darker bands, extremities a little produced. Length, 21 mill.

Australia, *Japan.*

Distinguished (perhaps not sufficiently) from the preceding species by its more pyriform contour and produced extremities. Reeve's figure (fig. 45), probably from a worn specimen, has no bands.

O. BREVIS, Sowb. Pl. 2, figs. 32, 33.

Thin, globosely inflated, whitish or purplish white, columella plicate in front, with a callous ridge behind, and a connecting longitudinal deposit. Length, 12 mill.

Australia.

The figures given by Reeve and Weinkauff do not represent this species, but *O. marginata*.

The shell is somewhat closely related to *O. margarita*, Sowb.

O. MARGARITA, Sowb. Pl. 2, figs. 34–40.

White, extremities somewhat beaked. Length, 10–13 mill.

Singapore, *Japan*, *Philippines*, *Australia.*

Less inflated, narrower, with more beaked extremities than *O. brevis*. *O. bulla*, Ad. and Reeve (figs. 36, 37), is a little heavier form, and *O. umbilicata*, Sowb. (figs. 38, 39), appears to be not quite adult; they do not seem to have any really distinctive characters. *O. ovoidea*, H. Ad. (fig. 40 , from the Red Sea, is only known by a short description and a figure of the base of the shell; I do not find distinctive characters in either.

O. BIMACULATA, A. Ad. Pl. 2, figs. 46, 47.

Livid white, obsoletely three-banded, back transversely striate, extremities of aperture stained with red within.

Length, 13 mill.

New Caledonia.

O. CARNEA, Poiret Pl. 2, figs. 48–52.

Yellowish, reddish or violet flesh-color, transversely striated, with frequently several angles or planes on the back, extremities beaked, somewhat produced, lip thick-margined, finely dentate, columella excavated below, with a callous ridge above, extremities of aperture often pink-tinged. Length, 12–15 mill.

Mediterranean Sea.

O. lactea and *O. triticea*, Costa, are synonyms; *O. triticea*, Lam., remains a somewhat doubtful species, the figures given by Kiener and Sowerby resembling *O. rhodia*, Ads., whilst those of Reeve (figs. 51, 52) and Küster are like *carnea*. Reeve's figure of *O. carnea* looks more like *O. rhodia*. The locality of *O. triticea* is supposed to be West Coast of Africa. Dunker identifies a Japanese shell with it, but he has used Sowerby's figures for comparison. *O. lepida*, Dillw., is a synonym of *triticea*.

O. RHODIA, A. Ad. Pl. 3, figs. 53, 54.

Shell rather narrow, produced at the extremities, flesh pink; columella excavated below, with a conspicuous white callus above, lip whitish. Length, 13 mill.

Japan.

See remarks under preceding species.

O. FRUTICUM, A. Ad. Pl. 3, figs. 55, 56.

Shell smooth, broadly banded with pinkish flesh-color, lip thick, varicose, extremities rotundately emarginated, columella callously ridged above and below, strongly one-plaited.

Length, 10 mill.

Malacca.

I am not acquainted with this species.

O. PYRULINA, A. Ad. Pl. 3, figs. 57, 58.

Pear-shaped, constricted and produced at the extremities, back rather gibbous in the middle; columella callously ridged above, lip moderately plicate; yellowish- or livid-white. Length, 12 mill.

New Caledonia.

O. CONCINNA, Ad. and Reeve. Pl. 3, figs. 59, 60, 74.

Angularly prominently gibbous in the middle, constricted at the extremities; white, or fleshy-white. Length, 9 mill.

Philippines, Japan.

O. Cumingii, Mörch (fig. 74), is a synonym.

O. PUNCTATA, Duclos. Pl. 3, figs. 61–64, 73.

Rather solid, transversely striate, whitish, with three rows of orange or carneous spots. Length, 10–11 mill.

China, Japan, Philippines, Australia, Isl. Bourbon.

O. alabaster, Reeve (fig. 64), has the spots very faint.

Var. PULCHELLA, H. Ad. (fig. 73).

The spots connected longitudinally by waved bands of color. One of Sowerby's figures of *punctata* represents this variety.

Mauritius.

O. ADAMSI, Reeve. Pl. 3, figs. 65, 66.

Ovate, inflated, whitish; back rather elevated in the middle, transversely incisely striated; extremities rather obtuse; lip

moderately thickened; aperture curved, rather broad, columella scarcely plicated. Length, 8 mill.

New Caledonia.

A delicate, rather inflated bubble-shaped shell, elaborately sculptured with engraved striæ. The foregoing is Reeve's diagnosis, the species being unknown to me. It is *O. marginata* of A. Ad., not Sowerby, and changed by Reeve as above.

O. BULLATA, Ad. and Reeve. Pl. 3, figs. 67–70.

Pinkish or purplish or yellowish white, somewhat gibbous on the back—which is smooth or transversely incisely striated; lip strongly margined, flesh-brown, somewhat squarely produced at the extremities. Length, 8 mill.

Singapore, *Japan*, *New Caledonia.*

O. scitula, Ads. (figs. 69, 70), is a synonym.

O. STRIATULA, Sowerby. Pl. 3, figs. 75–80.

Back strongly angularly gibbous in the middle, attenuately produced at the extremities, striate or smooth; lip strongly margined; pinkish- or yellowish-white. Length, 10 mill.

Straits of Malacca, *Loo Choo Is.*, *Philippines*, *Japan.*

I unite with this *O. dorsuosum*, Hinds (figs. 77, 78), and *O. dentata*, Ad. and Reeve (figs. 79, 80). The following species is also probably a synonym.

O. FRUMENTUM, Sowerby. Pl. 3, figs. 71, 72.

Smaller than the preceding, of which it may be a variety; the form is similar, but the back does not show the angle, although evidently gibbous. Length, 6 mill.

Hab. unknown.

Subgenus CYPHOMA, Bolten, 1798.

O. GIBBOSA, Linn. Pl. 3, figs. 81, 82.

Rather thick, smooth, polished; pale straw-color or whitish, stained on the sides with fawn-color; extremities obtuse; lip callously margined, scarcely dentate. Length, 1–1·25 inches.

Florida, *West Indies.*

Lamarck probably confounded *O. intermedia*, Sowb., with this species in giving Brazil as habitat, and Cuming in referring it to Panama very likely mistook the next species for it. It is *O. pharetra* of Perry and *O. dorsata*, Bolten.

O. EMARGINATA, Sowb. Pl. 3, figs. 83, 84.

Flesh-white or whitish, the ridge sharper than in the preceding species and white, lip heavily margined, also white, extremities rostrate, narrower. Length, 1 inch.

Panama.

The back is often finely transversely striate.

O. INTERMEDIA, Sowerby. Pl. 3, figs. 85, 86.

Rather solid, smooth, polished, whitish or tinged with yellowish brown; back gibbous, with faint indication of a transverse ridge or angle, and often showing a still fainter anterior one; extremities narrowly produced; lip strongly margined, scarcely dentate; columella with a callous posterior plication.

Length, 1–1·5 inches.

Brazil, West Indies.

Smaller specimens show the angle very plainly; sometimes in these it is conspicuously sharp. The shell connects this group with Neosimnia in such manner that it is difficult to decide where it ought to be placed. *O. oblonga* of Martini, and *O. spelta*, Dillwyn, are synonyms.

O. OBTUSA, Sowb. Pl. 3, figs. 87–89.

Yellowish- or pinkish-white, obtusely angulated on the back, extremities produced, lip callously margined. Length, 16 mill.

China, Japan.

Something like a miniature *O. intermedia*. *O. Indica*, Reeve, (fig. 89), from Bombay, appears to be a minor form.

O. TRAILLI, A. Ad. Pl. 3, figs. 90, 91.

Flesh-colored, smooth, back strongly angularly gibbous, extremities narrowly produced. Length, 11 mill.

Malacca.

O. FORMOSA, Adams and Reeve. Pl. 4, figs. 15, 16.

Gibbous, slightly angulated across the back, transversely striate, purplish orange, the extremities orange-tipped; aperture narrow, but little widened below, the columella callous above, the outer lip-margin conspicuously dentate. Length, 12 mill.

Borneo, Japan.

O. SEMPERI, Weinkauff. Pl. 4, figs. 17, 18; Pl. 5, fig. 19.

Purplish yellow or orange-red, the margin orange-red; back

angulated above the middle, lip conspicuously dentate, columella dentate above. Length, 13 mill.

Borneo, *Viti Isles*.

The aperture is wider below, the angle of the back more posterior than in the preceding species, of which it may nevertheless be only a variety. It is *O. hordacea* of Sowerby and Reeve, not Lamarck.

Subgenus VOLVA, Bolten, 1798.

O. VOLVA, Linn. Pl. 4, figs. 94, 95.

Pinkish or brownish flesh-color, back transversely incisely striated, extremities with raised striæ, lip thickly margined, nearly smooth, interior flesh-colored or brownish.

Length, 3–5 inches.

China, *Philippines*, *Japan*.

O. LONGIROSTRA, Sowb. Pl. 4, figs. 92, 93.

Yellowish white, moderately gibbously angled in the middle, lip callously reflected. Length, 1·75–2·5 inches.

Isl. of Bourbon.

O. RECURVA, Adams and Reeve. Pl. 4, figs. 96, 97.

White, transversely minutely striated, gibbously angled in the middle, lip callously margined. Length, 22 mill.

China, *Japan*.

Possibly a minor variety of *O. longirostra*.

O. GRACILIS, Ads. and Reeve. Pl. 4, figs. 98, 99.

Pale fulvous, maculated with red next the margin of the thickened lip. Length, 11 mill.

East Coast of Borneo.

O. PHILIPPINARUM, Sowb. Pl. 4, figs. 100–9.

Livid flesh-color, rather thin, thickened margin of lip yellowish white. Length, ·75–1·25 inches.

Philippines, *Japan*, *Australia*.

With this species I unite as synonyms *O. Carpenteri*, Dunker (fig. 2); *O. Angasi*, A. Ad. (figs. 3, 4), and *O. depressa*, Sowb. (fig. 5), with its variety *rosea*, Rositer, from Australia; *O. subreflexa*, Ad. and Reeve (figs. 6, 7); *O. deflexa*, Sowb. (fig. 8), and the Japanese *O. Adamsii*, Dunker (fig. 9), which differs in no appreciable degree from *Angasi*.

O. BIROSTRIS, Linn. Pl. 4, figs. 10–14.

Reddish flesh-color, sometimes pale-banded in the middle, smooth, shining, thickened lip-margin yellowish white.

Length, 1·5 inches.

Singapore, *Japan*, *Philippines*.

Larger, and wider in proportion than the last species; yet I doubt their distinctness. The synonymy includes *O. brevirostris*, Schum.; *O. aperta*, Sowb. (fig. 12), a young shell, and *O. rosea*, A. Ad. (figs. 13, 14).

O. LANCEOLATA, Sowb. Pl. 5, figs. 20, 21.

Narrowly compressed, back densely transversely striated, extremities rather blunt; orange-pink; lip and columella callously involute, aperture very narrow. Length, 21 mill.

Philippines.

O. COARCTATA, Adams and Reeve. Pl. 5, fig. 22.

Elongated, ventricose in the middle, fulvous, back transversely minutely striated, extremities contracted, columella rather depressed. Length, 7 mill.

Straits of Sunda.

This may possibly be a minor variety of the preceding species, which it closely resembles in form.

O. ACICULARIS, Lam. Pl. 5, figs. 23–25.

Yellowish to purplish, thin, smooth, narrow, extremities rather bluntly produced, lip thinly margined, with a callous margin on the columella. Length, 15 mill.

West Indies, *South Carolina*, *Florida*.

It is *O. secale* of Dillwyn's Catalogue.

Subgenus NEOSIMNIA, Fischer, 1884.

O. SOWERBYANA, Weinkauff. Pl. 5, figs. 26, 27.

Somewhat ventricose, short beaked, rosy flesh-color, sometimes obscurely banded, rather thin, lip-margin thickened, smoothish, yellowish. Length, 1–1·25 inches.

South Sea.

This is *O. spelta* of Sowerby and Reeve, not Lamarck.

O. SECALIS, Sowb. Pl. 5, figs. 28–30.

Purplish white, extremities rather blunt, lip-margin yellowish white. Length, 15 mill.

Eastern Seas, Friendly Isles.

The distinction between this and the preceding species is so slight that I think they will prove identical. *O. seminulum*, Sowerby (fig. 30), from Friendly Islands, is a synonym.

O. BORBONICA, Desh. Pl. 5, fig. 31.

Rosy white, ventricose in the middle, thin, translucent, transversely striate, aperture very narrow. Length, 7 mill.

Isle of Bourbon.

I am not acquainted with this species.

O. ACUMINATA, Ad. and Reeve.

Rather stout, yellowish white, lip thickened. Length, 8 mill.

East Indies, Japan.

Perhaps a small variety of the preceding species.

O. SPELTA, Linn. Pl. 5, figs. 32, 33.

Whitish or flesh-color, smooth, polished, aperture rather wide anteriorly, lip-margin and extremities of shell callously thickened. Length, 15–20 mill.

Mediterranean Sea, Canary Is.

This is not *O. spelta* of Sowb. and Reeve (see *Sowerbyana*, above). The synonymy includes *O. hordacea*, Costa; *O. purpurea*, Risso, and *O. Leathesi* of Wood's Crag Mollusca.

O. HORDACEA, Lamarck. Pl. 5, figs. 34–38.

Yellowish red to purplish, smooth, extremities obtuse. Length, 12 mill.

Coast of Africa? Philippines.

Differs subgenerically from the species which Sowerby and Reeve have figured under this name, and which Weinkauff calls *O. Semperi*. *O. formicaria*, Sowb. (figs. 37, 38), may be included.

O. UNIPLICATA, Sowb. Pl. 5, figs. 39–50.

Yellowish white to purplish, rather thin, transversely very minutely incised, or smooth, polished; narrow, with the extrem-

ities bluntly produced; lip narrow margined; posterior plication prominent. Length, 15–18 mill.

North Carolina to *West Indies*, *Brazil*,
Panama to *California* (Var.)

In this species the color of its shell changes to correspond with that of the gorgonia on which it feeds, either yellowish white or purple. The synonymy includes *O. Antillarum*, Reeve (fig. 41); *O. Canadiensis*, Mörch; *O. Carolinensis*, Mörch; *O. subrostrata*, Sowb. (fig. 42); *O. arcuata*, Reeve (fig. 43). The following species occurring on the West Coast of America are added, as I can find no distinctive characters. It may be remarked, however, that so far as I am able to judge from the figures and numerous specimens, these West Coast representatives are always dark purple with a lighter purple lip-margin—coloring which somewhat rarely obtains with the East Coast individuals; on this account they may be grouped under the best known, but not earliest name, as:—

Var. VARIABILIS, C. B. Adams (fig. 44).

With this I include *O. Californica*, Reeve (fig. 45); *O. æqualis*, Sowb. (fig. 46), *O. livida*, Reeve (fig. 47); *O. rufa*, Sowb. (fig. 48); *O. inflexa*, Sowb. (fig. 49), and *O. Loebbeckeana*, Weink. (fig. 50), which probably does *not* come from Vancouver's Island.

O. AVENA, Sowb. Pl. 5, figs. 51–55.

Light purplish or rosy, wider than the preceding species, the extremities shorter, often orange-tipped, lip-margin rosy-white. Length, 12–20 mill.

Panama to *Monterey*, *Cal.*

The synonyms are *O. similis*, Sowb. (figs. 52, 53), perhaps *O. neglecta*, C. B. Ad. (fig. 54), and *O. Vidleri*, Sowb. (fig. 55).

Subgenus CRITHE, Gould, 1860.

O. ATOMARIA, Gould.

Very minute, glossy white, somewhat acute at the extremities, with a delicate groove at the summit; aperture very narrow, and uniformly so; rostrum short, slightly recurved; ventral laminæ directly transverse, about eight in number, as they pass into the aperture, giving the appearance of coarse denticles on the pillar.

Animal citron-colored, viscera slate-colored, eyes reddish black, very small. L. 5 mill., diam. 3 mill.

China Seas (Stimpson).

Unfigured, and the specimens destroyed by fire.

Subgenus CALPURNUS, Montfort, 1810.

O. VERRUCOSA, Linn. Pl. 5, figs. 56–58.

White, with fine incised transverse striæ, extremities rosy tipped. Length, 1·25 inches.

East Africa, *Indian Ocean*, *Philippines*, *N Caledonia*.

Unfigured and Doubtful Species.

O. BULLATA, Gould (sp. name preoccupied). *Hab. unknown.*
O. ALBA and O. NIGERRIMA, Dufo. *Seychelles.*
O. (CYPHOMA) ELONGATA, A. Ad. *Japan.*
O. (BIROSTRA) MCCOYI, Tenison-Woods. *Australia.*
O. GALLINACEA and O. CORRUGATA, Hinds. = ERATO, Manual, v, 10, 11.

Family *DOLIIDÆ.*

Shell thin, ventricose, ovate or subglobose, spire short, the body-whorl very large, with revolving ribs or decussated. No operculum in the adult.

Animal very large; the mantle dilated; head wide, bearing two elongated distant tentacles, dilated at the base, and having eyes near the base; proboscis cylindrical, greatly developed, extensible and flexible; foot lobed and dilated in front, with a horizontal groove.

Dentition. Central tooth short, wide, with an elongated central and some shorter lateral cusps, lateral and first marginal with simple or denticulated margin, sharp-pointed, outer marginal tooth sharp, simple (Pl. 1, fig. 1). Jaw (Pl. 1, fig. 2).

Some species at least, of Macgillivrayia, are known to be the larva of Dolium. They have four tentacles, and the foot is provided with a float resembling Ianthina; the shell has a thin, corneous operculum, afterwards lost.

The family resembles Cassididæ rather closely, but differs by the want of varices on the shell and the absence of an operculum; but the subgenus Malea of this family, having a ringent mouth, has much analogy with Cyprædassis of the Cassididæ, which, according to Stutchbury, is equally deprived of an operculum. The family Oocorythidæ, containing a single species, may be placed between the two; it is in shell characters essentially an operculate Dolium. Prof. Mörch and others place the Tritonidæ in intimate relation with the foregoing families on account of a similar dentition; and Mörch points out that certain species of Triton possess the revolving ribs and somewhat of the form of Dolium. Oocorys itself is thought by Fischer to be somewhat closely allied with Tritonidæ. The relations of Triton with Murex are also evident. Thus it is that transition forms, and complex relationships everywhere baffle the naturalist who attempts to classify in a lineal series. The shells are mostly of quite large size, and the species are few in number, inhabiting warm seas; fossil, a cretaceous form is known, with some tertiary species.

Synopsis of Genera.

Genus DOLIUM, Lam., 1801.

Shell thin, ventricose, globosely oval; spire short, whorls with spiral depressed ribs; mouth very large, the lip crenulated, sillonated within, columella canaliculated, anterior end of aperture not produced obliquely, widely sillonated.

About fifteen species occur in the seas of China, Philippines, Australia, Mediterranean, West Indies, etc.

The section *Perdix*, Montfort, 1810, has been used for the separation of species with open umbilicus and (so-called) simple lip, but the gradual gradation from this form to those with closed umbilicus, and more strongly crenulated lip appears to deprive the group of any real value. Another section, *Doliopsis* (preoccupied by Conrad), has been proposed by Monterosato for a single Mediterranean species, imperforate, with expanded denticulated lip.

Subgenus DOLIOPSIS, Conrad, 1865.

The figure of the type has a short canal, and appears intermediate between Dolium and Pyrula. Two Oregon fossils subsequently referred to the group by Conrad are very similar to recent Dolium.

DOLIOPSIS QUINQUECOSTA, Conrad (Pl. 5, fig. 32). Eocene, *Miss.*

Subgenus MALEA, Val., 1833.

Form of Dolium, but the lip thickened, somewhat reflected and strongly denticulated the inner lip with two calloused plicate prominences. *Cadium*, Link, 1807, is said to equal this group.

The animal differs from Dolium by its foot being less dilated in front, not angular laterally, and by its branchiæ, which are nearly equal.

Genus PYRULA, Lamarck, 1799.

Shell imperforate, thin, pear-shaped, spirally ribbed, or decussated, terminating anteriorly in a moderate, open canal; spire very short; lip thin, smooth on the margin. No operculum. Dentition (Pl. 6, fig. 38).

Animal with a very large foot, truncated in front, produced at the front angles, acuminated behind; head and neck narrow

and long, tentacles subulate, with eyes at their exterior base; mantle-lobes large, reflected over the shell; siphon very long and narrow.

A few species inhabit the West Indies, Panama, Indian Ocean, Philippines, etc. The genus appeared in the cretaceous, and became widely spread in the tertiary, remains being found in North and South America, Europe and Asia.

The generic name has been made to include a number of groups, such as Hemifusus, Melongena, etc., which have but little in common with the present genus. The type cited by Lamarck is *Bulla ficus*, Linn., which fixes its pertinence to the genus now under consideration, and degrades to the synonymy such names as *Ficus*, Klein, *Ficula*, Swains., and *Sycotypus*, H. and A. Adams, not Browne.

Mr. Arthur Adams writes:—

"The employment of the dredge gave me an opportunity of here first observing the animal of Ficula, which very much resembles that of Dolium in the large, thin, flattened foot, rounded in front, with two sharp, angular, lateral processes, and extended and acuminated behind; in the long, recurved siphon, and slender, tapering tentacula; in having a long, extensile and retractile proboscis; in the position of the organs of vision; and in the general shape, structure, and lightness of the shell; while the singular fact of the mantle covering the sides of the shell, would seem to approximate it to Calpurnus, Ovulum, Marginella and the Cowries.

"Although exceedingly timid and sensitive, the Ficula is a very lively animal, when observed in its native waters, crawling along with considerable velocity, and, owing probably to the lightness of its shell, able to ascend with facility the sides of a glass vessel, which held it captive. The proboscis is rarely exserted when the animal is in motion; but the long, tapering tentacles are stretched out to their full extent, and the siphon is directed more frequently forwards than over the back of the animal. The animal of *Ficula ficoides* is light, marbled violet, and the head and tentacles are white; six white, opaque spots are arranged round the upper surface of the edge of the foot; the rest of the body is light delicate pink, with marbled markings of a darker pink.

"In another species which I observed, and of which I also made a drawing (the *Ficula lævigata*, Reeve), the mantle is bright pink, mottled with white and deeper pink, the under surface of the ventral disc being of a dark-chocolate color, with yellow, scattered spots; the head and neck are pink, and also colored with yellow spots.

"The Ficula shells, seen in cabinets, convey but a poor idea of these handsome mollusks, observed in the living state, crawling rapidly along, bearing their light, elegantly formed shells, easily and gracefully, with their siphons erect, their foot expanded, like a broad flattened disc, and their bodies ornamented with delicate colors, beautifully marbled, and moving their long, flat heads, and peering about with their large, black eyes, in a manner which is surprising, when one considers the position these animals occupy in the scale of creation, and that but a very small share of intelligence is, in general, supposed to be the lot of most mollusca."—*Narrat. Voy. Samarang*, ii, 358.

Subgenus Ptychosyca, Gabb, 1876.

Shell shaped like Pyrula; inner lip with one anterior very oblique fold.

P. inornata, Gabb. Cretaceous, *Georgia* (Fig'd S. & S. Conch., t. 62, f. 39).

Dr. Fischer thinks it allied to *Liostoma*.

Subgenus Ficulopsis, Stoliczka, 1867.

Pyriform, attenuated in front, inflated behind; spire very short; surface spirally and transversely striate or costulate; columella thick, angulated, plicate.

P. Pondicherriensis, Forbes. Cretaceous, *So. India* (Fig'd S. & S. Conch., t. 62, f. 38).

The family has been monographed by Reeve, Kiener and Küster (Conchylien Cabinet). Kobelt has also published a catalogue of the species of Dolium in Jahrb. Mal. Gesell., ii, 263, and Hanley another, in Proc. Zool. Soc. London, 491, 1859. Sowerby monographed Ficula in the Thesaurus, iv, 1880, and Kobelt catalogued it in the Jahrbücher, 359, 1875, and published a monograph in Küster's Conch. Cab., 1874.

Genus DOLIUM, Lam., 1801.

D. GALEA, Linn. Pl. 1, fig. 3.

Thin, narrowly umbilicated, spire short, with sunken sutures; whorls seven, spirally ribbed, the ribs flatly convex, close-set, often with an intervening ridge on the upper portion of the whorls; columella somewhat twisted; pale fulvous, inner margin of lip stained with chocolate-brown, upper part of columella and the apex of the spire often chocolate also. Length, 8–9 inches.

Mediterranean Sea, *Beaufort*, *N. C.*, *to West Indies*, *Brazil.*

D. tenue, Menke, is the juvenile shell; it is also *Buccinum olearium*, Linn. (not *D. olearium*, Brug.). Mörch has described another juvenile as *D. Antillarum*. Gregorio has recently described three varieties (*spirintrorsum*, *terdina* and *epidermata*) from the vicinity of Palermo.

D. MELANOSTOMA, Jay. Pl. 1, figs. 4, 5.

Ribs about half the number of those of *D. galea*, and much broader, with narrow intervening smaller ridges and grooves; fulvous white, columellar callus and a broad interior margin of the outer lip both stained dark chocolate-brown. Length, 9 inches.

Elizabeth Reef, *So. Pacific O.* (Brazier);

Friendly Islands (Jay); *Hawaiian Islands* (Pease).

The shell which Reeve (fig. 5) has figured for this species appears to be more nearly allied to the preceding, but possibly the ribs are variable in number according to the size of the shell. Pease saw a specimen 35 inches in circumference, and says that those measuring 24 inches are usual. As Brazier refers to Reeve's figure it is very likely that he has mistaken the species; as has also Küster, who copies the figure in Reeve. The true *melanostoma* may = the succeeding species, and if so, has priority of publication.

D. LUTEOSTOMA, Küster. Pl. 1, fig. 6; Pl. 2, fig. 7.

Body-whorl with fifteen to eighteen revolving, wide ribs and narrow interstices, the latter bearing small ribs, paired on the upper part of the whorl; yellowish brown, variegated with chestnut maculations; interior of aperture deep yellowish brown. Length, 7–8 inches.

Japan.

The description is made from *D. Japonicum*, Dunker (fig. 7),

which appears to be the usual fresh state of the species. Küster's earlier diagnosis was prepared from a faded or varietal form in which the maculations have disappeared or are but feebly shown. One of the figures (t. 63, f. 1) given by Küster for *D. variegatum*, appears to represent this species; which is certainly very closely allied to *D. melanostoma*.

D. VARIEGATUM, Lam. Pl. 3, figs. 13, 14.

Umbilicated, whorls 7, the last bearing fifteen to eighteen spiral ribs, the interstices nearly as wide, the upper ones bearing an intermediate smaller rib; whitish, maculated with chestnut on the ribs, often with one or two ribs more yellowish in color, upon which there are no maculations. Spire more elevated, and suture less impressed than in the preceding species.

Length, 4–9 inches. *North Australia.*

D. Kieneri, Phil., is a synonym.

Var. CHINENSE, Dillwyn. Fig. 14.

Smaller, of lighter structure and more contracted growth, most of the interstices of the eighteen to twenty ribs bearing a smaller rib. Fine specimens are usually alternately banded spirally with light yellow and whitish, the ribs of the latter only showing chestnut maculations.

China.

This is *D. australe* of Mörch.

D. OLEARIUM, Brug. Pl. 2, figs. 8–11.

Spirally broadly ribbed, with very narrow, shallow interstices; fulvous chestnut maculated with white; suture deep.

Length, 3–5 inches.

Indian Ocean, Philippines.

A very frequent state of this species has the surface worn so that the grooves are indicated more by darker spiral lines than by their very shallow depression.

Var. CUMINGII, Hanley. Pl. 2, fig. 9.

Ribs more numerous and, with the groove, more distinct, whorls not so deep-sutured, maculations interrupted with spiral, longitudinally lineated bands.

Philippines.

Var. DESHAYESII, Reeve. Pl. 2, fig. 10.

Suture slightly impressed; pale fulvous chestnut, painted

with bands of rather distant conspicuous white spots, shaded with brown.

Philippines.

My specimens indicate the pertinence of these forms to *D. olearium*. *Bulla canaliculata*, Linn., is the young shell, as determined by Hanley, from the type.

Var. TESTARDI, Montr. Pl. 2, fig. 11.

Ribs about twenty-three, with distinct narrow intermediate grooves; pale fulvous, longitudinally clouded with darker color.

New Caledonia.

D. ZONATUM, Green. Pl. 3, fig. 17.

Yellowish chestnut-color, ribs with an intermediate ridge, which is divided into three ridges between the upper ribs.

Length, 4–7 inches.

China, Japan.

Allied to *D. galea*, but differs in the intermediate ridges. *D. crenulatum*, Phil., is a synonym.

D. CROSSEANUM, Monterosato. Pl. 2, fig. 12.

Yellowish brown; with thirty-six ribs, the interstices with from one to three liræ; lip brownish flesh-color.

Length, 81 mill.

Near Palermo, Sicily.

I cannot count nearly thirty-six ribs on the figure of the unique example of this species, and I am very much disposed to believe it a synonym of the preceding, and that it has accidentally become mixed with Mediterranean shells.

D. FASCIATUM, Brug. Pl. 3, fig. 16.

Interstices of the ribs without ridges; white, five-banded with chestnut. Length, 4–5 inches.

Philippines, China, Japan.

D. sulcosum, Dillw., is a synonym.

D. COSTATUM, Menke. Pl. 4, figs. 19–22; Pl. 3, fig. 18.

Ribs distant, prominent, nine to thirteen or fourteen in number, the interstices broader, smooth, or faintly ridged in the middle; yellowish white, flesh-color or brownish.

Length, 3·5–6 inches.

East Indies, Philippines, Mauritius.

It is *D. fasciatum*, var., of Kiener (fig. 19); *D. lactescens*, Martyn; *D. latesulcatum*, Martini; *D. ampullaceum*, Phil. (fig. 20).

Var. MACULATUM, Lam. Pl. 4, fig. 21.

The costæ, nine to eleven in number, maculated somewhat regularly with chestnut. This has been regarded as a distinct species, but a series before me connects the two; intermediates also connect this variety with

Var. FIMBRIATUM, Sowerby. Pl. 4, fig. 22; Pl. 3, fig. 18.

The ribs usually vary in number from twelve to fourteen, tessellated with chestnut. The name is derived from the fimbriated margin of the outer lip, but this is common to all the varieties when fully grown.

Senegal, *Manilla*, *Japan*.

If these two varieties had not been recognized very generally as distinct species, I would not have separated them as even varietal forms, as their features want constancy. *D. cassis* (Bolten), Mörch; *Buccinum dolium*, Linn.; *D. minjac*, Adanson, and *D. tessellatum*, Encyc. Meth., are names given to the two varieties, but not readily assignable to either separately. The Senegal locality is given on the authority of Adanson. *D. Lischkeanum*, Küster (fig. 18), is a full synonyn of var. *fimbriatum*, as are probably the unfigured *D. Reevei*, Hanley, and possibly *D. Favannei* (likewise unfigured) of the same author, and *D. marginatum*, Philippi (unfigured).

D. PERDIX, Linn. Pl. 3, fig. 15; Pl. 4, figs. 23–25.

Shell thin, inflated, with about twenty low ribs, and rather narrow shallow intervening grooves; fulvous brown or light reddish bay, more or less plentifully marked with whitish lunate spots or maculations. Length, 5–9 inches.

Indian Ocean, *Mauritius*, *Polynesia*,
West Africa, *West Indies*, *Brazil*.

There can be no doubt of the immense distribution of this species. Dr. Jacob Green, many years ago described a shell as *D. plumatum* which has been supposed to be the West Indian *D. perdix*, and Prof. Mörch has called it *D. pennatum;* it has no distinctive features. Other synonyms are *Perdix reticulatus*, Montfort; *Dolium rufum*, Blainv. Fischer has described and

figured embryonic and young shells, in Jour. de Conch., 147, 1863 (figs. 23, 24); they were diagnosed by Prof. C. B. Adams, in error, as *Helix sulphurea*.

Subgenus MALEA, Val., 1833.

D. POMUM, Linn. Pl. 5, fig. 26.

Ribs low, about twelve in number, with shallow interstices; columella plicate, excavated in the middle, lip thickened within and plicate; fulvous bay, clouded and maculated with white.

Length, 3 inches.

Red Sea, *Indian Ocean*, *Philippines*, *Society Islands*.

This shell is *Cassis labrosa*, Martini.

D. RINGENS, Swainson. Pl. 5, fig. 27.

Globose, rather thick, with about sixteen spiral ribs, the interstices sometimes obscurely single ridged; columella plicate, excavated in the middle; outer lip wide-margined and dentate; light fulvous, obscurely maculated with white when young.

Length, 4-8 inches.

Peru, *Panama*, *Mazatlan*.

The synonymy includes *D. dentatum*, Barnes; *D. crassilabris* and *D. latilabris*, Val.; *D. personatum* and *D. plicosum*, Menke.

Unfigured Species of Dolium.

D. BAIRDII, Verrill and Smith. Dredged living off *Martha's Vineyard*, and off *Delaware Bay*, *U. S.*

D. AMPHORA, Philippi. *Hab. unknown.*

D. DUNKERI, Hanley. (Juvenile.) *Natal.*

D. ALBUM, Conrad. (Allied to *D. perdix*.) *Hab. unknown.*

Genus PYRULA, Lam., 1799.

P. RETICULATA, Lam. Pl. 5, fig. 28; Pl. 6, fig. 33.

Cancellated by rather close, sharp, small longitudinal and spiral ridges, the latter often alternately larger and smaller; yellowish, clouded with light brown, with about five obscure whitish bands bearing chestnut maculations. Length, 2·5–3·5 inches.

Indian Ocean, *East Indies*, *Japan*.

Sowerby has in error figured this species as *P. decussata*, Wood. It is *P. ficoides*, Lam. (fig. 28); *P. clathrata*, Rousseau (fig. 33); *P. fortior*, Mörch (assigned to West Indies in error).

P. DECUSSATA, Wood. Pl. 6, fig. 34.

Spiral ribs small, distant, the wide interstices with three or four revolving threads, of which the middle one is usually more prominent; closely longitudinally ridged, interrupted by the spiral ribs; yellowish brown, maculated with chestnut on the ribs. Length, 3–5 inches.

Panama to *Cape St. Lucas*, *L. Cal.*

A common and beautiful species, of which a short, swollen variety was described by Sowerby as *P. ventricosa*. Reeve gives no habitat, and in the Thesaurus, where it is figured in error as *P. reticulata*, it is assigned to the Indian Ocean.

P. PAPYRATIA, Say. Pl. 6, fig. 35.

Shell slimmer than *P. reticulata*, similarly but more delicately sculptured; brownish white, or blush white, deeper brown within the aperture, sometimes faintly longitudinally strigate with yellowish brown, but always without maculations.

Length, 3–4 inches.

Beaufort, *N. C.*, to *West Indies*.

A common species on our Southern Coast. It is not figured either in Reeve's Iconia or the Thesaurus, but Sowerby figures it in his "Genera of Shells" in error for *P. reticulata*, Lam. It is *P. gracilis*, Phil.

P. FICUS, Linn. Pl. 5, fig. 29; Pl. 6, figs. 36, 37.

Abbreviately pyriform, closely, minutely, spirally flat-ribbed, longitudinal sculpture minute, scarcely visible; whitish, interruptedly maculated and clouded with faint chestnut, interrupted by several faint white spiral bands upon which there are darker chestnut maculations; interior brownish or purplish.

Length, 3–4 inches.

Red Sea, *Indian Ocean*, *Singapore*.

Reeve changed the name to *lævigata*, because Linnæus included *P. reticulata* in his original description.

Var. PELLUCIDA, Desh. Pl. 6, fig. 37.

Orange-brown, with five or six equidistant spiral series of small distant chestnut spots, somewhat regularly arranged.

P DUSSUMIERI, Valenc. Pl. 5, fig. 30.

Narrowly pyriform, encircled by numerous small spiral flat-

topped ridges, and nearly equal interspaces, the latter longitudinally striate; pale fawn-color, with undulating, longitudinal darker streaks. Length, 3–6 inches.

China.

P. elongata, Gray, is probably a synonym.

P. TESSELLATA, Kobelt. Pl. 5, fig. 31.

Pyriform, spire subimmersed, clathrate; whitish, regularly distantly spotted with chestnut in spiral series.

Length, 1·5–1·75 inches.

Rosemary Is., Australia.

A beautiful species, of which a fine series is before me.

FAMILY *OOCORYTHIDÆ*, Fischer, 1884.

Shell bucciniform, aperture semioval, lip varicose externally, columella obliquely truncate at base. Operculum corneous, paucispiral.

Animal with broad head and large, sharp tentacles, no eyes, siphon short, foot short and wide, obtuse behind, with an anterior marginal excision, branchiæ very unequal. Dentition 2·1·1·1·2, the central tooth multicuspid, the laterals multicuspid, arcuated, the marginals simple and sharp (Pl. 6, fig. 39). Appears to connect Dolium with the Linatella group of Triton.

Genus OOCORYS, Fischer, 1884.

Characters those of the family. *Benthodolium*, Verrill and Smith, is a synonym.

O. SULCATA, Fischer. Pl. 6, figs. 42, 40, 41.

Shell ventricose, thin, spirally closely sculptured, with growth-lines crossing both ribs and interspaces; epidermis thin, brownish-yellow, not hairy; color white and translucent beneath the epidermis, inner lip thinly callous. Length, 45 mill.

Deep Sea, off Southern Coast of New England.

Off West Africa and Azores, from 1258 to 4000 mètres.

Benthodolium abyssorum, Verrill and Smith (figs. 40, 41), is a synonym.

Family *CASSIDIDÆ*.

Shell solid, subglobular or triangular, with short spire; whorls sometimes varicose; aperture terminating anteriorly in a short, recurved canal; columella callous, spread out, usually plicate; outer lip-margin thickened, dentate within.

Operculum corneous, concentric, elongated, semilunar, the nucleus at the centre of the inner margin (Pl. 1, fig. 43).

Animal with large head, eyes at the exterior base of the tentacles, proboscis cylindrical, extensible, mantle and foot large. Dentition (Pl. 1, fig. 44). The Cassides are active and voracious, living in sandy localities and preying on bivalve mollusks. The varices of the shell persist in its interior.

Synopsis of Genera.

Genus CASSIS (Klein, 1753), Lamarck, 1799.

Shell usually rather solid and thick, with the last whorl very large, often varicose; aperture longitudinal, narrow; outer lip with a thickened, reflected margin, and dentate within; inner lip rugosely plicate. On the use of species of Cassis in cameo cutting, see Structural and Systematic Conchology, ii, 200. About twenty-five species are known, inhabiting warm seas. The genus first appeared in the tertiary.

Section I. Cassis (*sensu stricto* = *Goniogalea*, Mörch, 1857).

Spire short, mouth narrow, dentate, lip externally margined, columella plicate. *C. Madagascariensis*, Lam.

Section II. Levenia, Gray, 1847.

Shell oval, subcylindrical, spire short, conic; aperture narrow, contracted in the middle, columellar lip plicate throughout, outer lip without external rib, dentate, inflected above. *C. coarctata*, Gray.

Section III. Cyprædassis, Stutchbury, 1837.

Shell ovate, spire short; mouth narrow, subcanaliculate behind, columella plicate its entire length; varices none or obsolete. ? No operculum. *C. rufa*, Linn.

Subgenus Semicassis (Klein, 1753), Mörch, 1852.

Spire moderate, sharp; shell oval with revolving sulci; lip

reflected, plicate; columella obliquely plicate. *C. saburon*, Adanson.

Cassidea, Swains., is referred to this group.

Section I. Semicassis (*sensu stricto*).

Section II. Bezoardica, Schum., 1817.

Shell varicose, angular behind, oval, with moderate spire; outer lip often spinously dentated in front. *C. glauca*, Linn. *Phalium*, Link, is another name for this section.

Section III. Casmaria, H. and A. Adams, 1853.

Shell smooth or longitudinally subplicate, spire moderate; inner lip smooth, callous; outer lip margined, smooth or slightly crenulated on the inner edge. *C. pyrum*, Lam.

Genus CASSIDARIA, Lam., 1812.

Shell nodulous, not varicose, ovate or oval-oblong, somewhat attenuated in front to a moderate, reflected, subascending canal; inner lip more or less spread over the body-whorl, tuberculated or plicate, outer lip reflected, ribbed, plicate within. Operculum corneous, the apex median and marginal, outer edge sinuous.

Animal similar to Cassis.

The few species are Mediterranean and West Indian. The genus appeared in the cretaceous period, and reached its maximum in the tertiary. *Morio*, Montfort, 1810; *Echinora*, Schum., 1817; *Galeodaria*, Conrad, 1865, and *Galeodea*, Link, 1807, are synonyms. *C. echinophora*, Linn.

Subgenus Sconsia, Gray, 1847.

Shell oval-fusiform, with revolving striæ, and a single longitudinal varix opposite the aperture; aperture long, canal short and slightly reflected; inner lip regularly plicate; outer lip rather thick, subreflected, plicate within. Animal and operculum unknown. A single recent, and some cretaceous and tertiary species. *C. striata*, Lam.

Genus ONISCIA, Sowerby, 1824.

Shell cylindrical, with short, conical spire and canal reflected at the base, surface tuberculated, mouth linear, lip reflected, thickened and plicate within, columella plicate.

These little shells are known by their transversely ribbed

nodulous whorls, and prominent, recurved siphonal canal; when fresh the surface is covered with a fine velvety epidermis. *Morum*, Bolten, 1798; *Ersina*, Gray, and *Lambidium*, Link, are synonyms.

The few species occur in the West Indies, Galapagos, China, etc. It is found in the eocene of Europe and miocene of N. America.

Section I. Oniscia (*sensu stricto*). *O. oniscus*, Linn. *Plesioniscia*, Fischer, 1884, should be considered synonymous.

Section II. Oniscidia, Swainson, 1840. *O. cancellata*, Sowb.

Genus PACHYBATHRON, Gaskoin, 1853.

Shell small, subcylindrical, longitudinally striated; spire very short, but with sharp apex; aperture narrow, very long, the inner lip spread over the body-whorl and transversely plicate, the outer lip thickened and denticulated within. 2 sp. *West Indies*. *P. marginelloideum*, Gask.

Some conchologists place this group in the family Marginellidæ; the dentition is unknown.

Genus CASSIS (Klein, 1753), Lamarck, 1799.

Section I. Cassis, *sensu stricto*.

C. cornuta, Linn. Pl. 2, fig. 49; Pl. 1, figs. 45, 46.

Honey-combed between the revolving ridges, with three spiral rows of distant compressed tubercles—those of the shoulder the most prominent; yellowish white, more or less tinged with yellowish brown, varices and belts sometimes brown-spotted; columellar and lip expansion much produced and rounded behind, yellowish cream-color, orange-brown within the aperture and between the teeth, which are whitish. Length, 8–12 inches.

Indian Ocean, *Tranquebar*, *Mauritius*, *Japan*, *Philippines; West Indies.*

Conrad distinguishes the West Indian specimens under the name of *C. labiata*, Chemn., as being more oblong, with the lip more widely expanded posteriorly into a flattened plane; the suite of specimens before me does not confirm this distinction.

Other synonyms are *C. Amboinensis*, Petiver, and *Buccinum brevirostrum*, Petiver.

C. CAMEO, Stimpson. Pl. 2, fig. 50.

This fine species has the same ground-coloring as *C. cornuta*, but may be recognized at once by the interstices of the teeth and ridges on the lip and columella being deep chocolate-brown. The outer surface is irregularly spirally ridged like *C. cornuta*, but is not honey-combed. Length, 7–10 inches.

Beaufort, N. C., to *West Indies.*

First described by Lamarck as *C. Madagascariensis*, but there is no evidence that it inhabits oriental waters.

C. TUBEROSA, Linn. Pl. 2, fig. 51.

Triangularly ovate, spirally ridged, and very closely longitudinally minutely plicate-striate, with three rows of distant spiral tubercles; yellowish brown, thickly marbled and spotted with chestnut and chocolate color, enameled face of columella, and outer lip flesh-white, the former chocolate between the plicæ, with a bright chocolate stain in the centre, the latter with chocolate transverse blotches. Length, 6–8 inches.

Beaufort, N. C., to *West Indies, Brazil.*

Said to have been collected by Cuming, at the Philippine Islands, and I have a specimen before me stated to have been obtained in Japan; yet these eastern localities must be considered very doubtful. It is *Bucc. striatum*, Gronov.; *C. undulata*, Humph.; *C. rotundata*, Perry.

C. FLAMMEA, Linn. Pl. 1, figs. 47, 48.

Oblong-oval, with three or four spiral rows of distant, large, obtuse tubercles, spire, and body-whorl, usually at the base only, distinctly rudely longitudinally ridged; cream-colored, clouded and crescent-marked with chestnut and chocolate; these markings are often apparent on the face, which is stained with chocolate in the middle and between the ridges, interstices of teeth on the outer lip also chocolate-stained, lip sometimes banded across. Length, 4–6 inches.

West Indies.

This species has also, like some of its predecessors been ascribed to East Indian localities—probably in error.

C. SPINOSA, Gronov. Pl. 4, fig. 62.

Shoulder with small, short, rather close spinous tubercles, occasionally slightly indicated in two or three rows on the body-whorl, which else is smooth, or marked by rugose growth-lines; above the shoulder are one or two necklace-like rows of small tubercles, appearing on the spire-whorls also; fleshy or orange-white, with obscure whitish bands, bearing lunate, shaded chocolate spots; shell rather thin, the columellar callus transparent, showing the color-markings beneath it. Length, 4–8 inches.

West Africa, Australia.

The synonyms are *C. Rumphii*, *C. tessellata* and *C. maculosa*, of Gmelin, and *C. fasciata*, Brug.

C. FIMBRIATA, Quoy. Pl. 3, fig. 55.

More strongly longitudinally ridged by growth-lines than the preceding species; it has the same shoulder-row of spines, but has none above, whilst below, on the body-whorl are two rows of rather prominent rude tubercles; flesh-white, marbled with light chocolate, with several distant rows of interrupted chocolate or chestnut lines; the latter show through the columellar callus, and the outer lip is chocolate-banded. Length, 3–4·5 inches.

Australia.

C. bicarinata, Jonas, is a synonym.

Section II. LEVENIA, Gray, 1847.

C. COARCTATA, Gray. Pl. 2, fig. 52.

Shell with three or four spiral rows of obtuse tubercles, and intermediate spiral ridges, which are sometimes broken up into granules; whitish, thickly marbled and spotted with chestnut; columellar callus thin above, showing the color-markings beneath, below stained with orange-brown, as is also the toothed lip-margin. Length, 2·5–3·5 inches.

Galapagos Is., Panama.

Distinguished at once by its outer lip, without external varix or expansion, and contracted above.

Section III. CYPRÆCASSIS, Stutchbury, 1837.

C. TENUIS, Gray. Pl. 2, fig. 53.

Rather thin, whorls nodulous on the shoulder, smooth, or indistinctly nodose in spiral series below, spirally regularly

grooved, grooves usually in pairs, the interstices obsoletely longitudinally ridged, strongly so at the base; whitish, thickly clouded and streaked with orange-brown or chestnut, often with four somewhat obscure bands of brown, with white lunate spots; columellar callus transparent above, orange-brown below, lip banded across with orange-brown. Length, 3–5 inches.

Galapagos Is.

When young, this species has a lip somewhat approximating to *C. coarctata;* when adult it is fully reflected. It is *C. Massenæ*, Kiener.

C. TESTICULUS, Linn. Pl. 2, fig. 54; Pl. 4, fig. 63.

Shell strongly longitudinally ridged, the ridges cut by regular spiral grooves; flesh-color, spotted with chocolate upon the interspaces of the grooves; columella plicate its whole length, outer lip strongly dentate, both yellowish white, the first shaded with orange-brown below, the latter cross-banded with orange-brown, external lip-margin marked with dark chocolate.

Length, 2–3 inches.

West Indies.

C. CRUMENA, Brug. Pl. 3, fig. 56.

Spiral sulcations obsolete, upper part of body-whorl with one or two rows of low tubercles.

West Africa, *Cape Verd Is.*, *West Indies.*

Is probably a variety only of *C. testiculus.*

C. RUFA, Linn. Pl. 3, figs. 57, 58.

Shell cowry-shaped, very thick, with three or four spiral rows of prominent nodules, and incised lines between them, decussated by longitudinal ridges; whitish or purplish flesh-color, stained and marbled with orange-red or chocolate; both lips very thick, yellowish or salmon-colored, orange-red to chocolate in the interstices of the ridges. Length, 5–7 inches.

Indian Ocean, *Mauritius*, *Japan.*

It is *Buccinum pennatum* and *B. ventricosum*, of Gmelin; *B. pullum*, of Born; the first and last-named for the juvenile shell.

Subgenus SEMICASSIS (Klein, 1753), Mörch, 1852.

Section I. TYPICAL.

C. SULCOSA, Bruguiere. Pl. 4, fig. 64–67; Pl. 3, figs. 59, 61.

Whorls, usually without varices, but often with rugose or tuberculate growth-lines, especially on the spire and upper part of body-whorl, equidistantly spirally groved; yellowish white, longitudinally streaked with light chestnut, sometimes the streaks are interrupted, forming spiral bands of tessellations; columella rugose and granulate, outer lip plicate-dentate, often enormously thickened. Length, 3–4 inches.

Mediterranean Sea, Portugal, W. Coast of Africa, West Indies, Brazil, W. Coast N. America from Panama to Guaymas.

A somewhat variable species as to form and sculpture, giving rise to several specific names—some of which I have retained in a varietal sense, although these forms grade one into another. The typical *sulcosa* has a somewhat elevated spire, the whorls well-rounded above. It, as well as the varieties, occurs at all the localities for the species. It is *C. undulata* and *C. gibba*, Gmelin; *C. decussata*, Pennant; and *Brugnonia pulchella*, Jeffreys, is probably the fry. Possibly *Buccinum malum*, *B. cepa* and *B. globulus*, Bolten, are also synonyms.

Var. INFLATA, Shaw. Pl. 4, fig. 65.

Somewhat thinner and more inflated than the type, often singly varicose, the lip not so much thickened, coloring more generally in tessellations, frequently one-varicose.

This variety is the usual form of the West Indies, although it occasionally occurs in Mediterranean specimens. It is *C. granulosa*, Brug.; *C. tessellata*, Pfr.; *C. trifasciata*, Gmelin; *C. lævigata*, Menke; *C. cicatricosa*, Gronov.; *C. granulata*, Born; *C. ventricosa*, Mart.

Var. ABBREVIATA, Lam. Pl. 3, figs. 61, 59; Pl. 4, figs. 66, 67; Pl. 5, fig. 71.

Spire shorter, the upper part of the whorls nodulous and somewhat angular.

This variety is very characteristic of specimens from the West Coast of North America, but it also occurs in the West Indies

and Europe. It is *C. granulosa*, var., and *C. lactea* (fig. 59), Kiener; *C. inflata*, var. β, of Reeve; *C. minuta*, Menke; *C. bilineata*, Gmelin, and *C. centiquadrata*, Val.

C. recurvirostrum, Wood (figs. 66, 67), said to come from Australia, varies between this variety and var. *inflata*.

Var. LEVILABIATA, Gregorio. Unfigured. *Mediterranean.*

C. SEMIGRANOSA, Wood. Pl. 3, fig. 60.

Upper portion of whorls granose, lower part obsoletely spirally grooved, outer lip smooth within, columella obliquely plicate below; whitish or flesh-color, often stained with fulvous rust-color. Length, 2 inches.

So. Australia, Tasmania.

C. CANALICULATA, Bruguiere. Pl. 5, figs. 72, 73.

Suture broadly, deeply channeled, whorls without varices, spirally engraved, columella plicately ridged below, lip toothed within; whitish or flesh-colored, with four rows of light chestnut tessellations, often obsolete. Length, 1·5–2 inches.

Ceylon, Philippines.

C. SABURON, Adanson. Pl. 5, figs. 74–78.

Shell with pretty close, engraved spiral grooves, lip irregularly dentate within; columella rugosely ridged below; flesh or brownish white, with four or five spiral rows of square chestnut spots, sometimes obsolete. Length, 2 inches.

Mediterranean Sea, Atlantic Coast of Spain to *Senegal.*

It is *C. pomum*, Wagner; *C. nucleus*, Küster; *C. reticulata*, Bellardi; *C. striatella* and *C. incrassata*, Grateloup; *C. texta*, Bronn.; and *C. diluvii*, *C. inflata* and *C. striata*, Serres.

Var. PILA, Reeve. Pl. 5, fig. 75.

Appears to differ only in being thinner, and usually smaller.

China, Philippines, Australia.

Var. JAPONICA, Reeve. Pl. 5, figs. 76, 77.

Very like the type, but usually varicose, the interstices of the grooves, especially on the spire and upper part of the body-whorl somewhat granular. Length, 2–2·5 inches.

Japan.

C. Pfeifferi, Hidalgo (fig. 77), is a not unusual form of this variety, with somewhat depressed spire and deep suture.

Var. BISULCATA, Schub. et Wagn. Pl. 5, fig. 78.

Thin and swollen like var. *pila*, with the granular spire of var. *Japonica*, the shoulder of the body-whorl with a couple of strong, shallow grooves.

Philippines.

Section II. BEZOARDICA, Schum., 1817.

C. GLAUCA, Linn. Pl. 6, figs. 79, 80.

Whorls smoothish, malleated, angulated above, the angle defined by a row of short spines, upper whorls decussated, last whorl one-varicose; columella plicately wrinkled below; outer lip toothed within, four-spined at the base; livid glaucous, sometimes indistinctly banded, lips cream-color to orange-brown, interior light chestnut-color. Length, 3–4 inches.

Singapore, *Philippines.*

This was re-named by Schumacher *Bezoardica vulgaris.*

C. CORONULATA, Sowerby. Pl. 6, fig. 81.

Smooth, not malleated, spinous procésses of the base of the lip only faintly indicated; color yellowish flesh, irregularly, undulately banded longitudinally, and regularly so spirally with light chestnut, the intersections of the bands forming darker-colored tessellations. Length, 2·5–3·5 inches.

Japan, *Philippines*, *Australia.*

Is possibly a well-marked variety only of the last species.

C. EXARATA, Reeve. Pl. 6, figs. 82, 83.

Whorls one-varicose, smooth, regularly spirally grooved, slantingly shouldered, shoulder and spire nodulous; whitish, with five rows of square chestnut spots. Length, 3 inches.

Isl. Bourbon (Deshayes).

C. AREOLA, Linn. Pl. 6, fig. 84.

Whorls one-varicose, obtusely concavely shouldered, smooth, shining, spire decussated, body-whorl with incised lines towards the base; lip toothed within, columella rugosely plicate below; whitish or purplish flesh-color, five-banded with large square-lunate chestnut or chocolate spots. Length, 2·5–3·5 inches.

Indian Ocean, *Philippines*, *N. S. Wales.*

C. STRIGATA, Gmelin. Pl. 7, fig. 85.

Whorls encircled throughout, or only at the base by engraved lines, one-varicose, striated and decussated on the spire and

shoulder of the body-whorl; yellowish white, with longitudinal streaks of chestnut. Length, 3–3·5 inches.

Moluccas, *China*, *Japan*, *Philippines*.

The synonyms are *C. zebra*, Lam.; *C. undata*, Desh.; *C. areola*, var., Brug.; *C. rugosa*, Gmelin.

C. PLICATA, Linn. Pl. 7, fig. 86.

Spire and shoulder of body-whorl decussated, rest of body-whorl longitudinally plicate, encircled by engraved lines, usually obsolete except towards the base, one-varicose; whitish, longitudinally undulately strigate with pale chestnut, the varices with chestnut maculations; interior chestnut-brown.

Length, 2·5–3 inches.

Moluccas.

It is *C. plicaria*, Lam.; *C. fimbria*, Gmel.

C. DECUSSATA, Lam. Pl. 7, figs. 87, 88.

Decussated throughout by elevated longitudinal striæ, and engraved spiral lines, one varicose, the varices spinous on the shoulder; yellowish flesh-color, with longitudinal streaks or quadrate spots of chestnut. Length, 2 inches.

Habitat?

Unites the coloring of *C. areola* and *C. strigata* with the form of *C. plicata;* varies from either in the sculpture, and spinous varices, from the two former in form.

Section III. CASMARIA, H. and A. Adams, 1853.

C. VIBEX, Linn. Pl. 7, figs. 89–91.

Shell smooth, without varices, lip four-spined at the base; fleshy ash-color, obscurely banded, and painted longitudinally with light chestnut flames continued from darker sutural markings; lip tessellated with chocolate externally; sometimes the body-whorl is encircled by indistinct series of short chocolate lines; interior orange-brown. Length, 2–3 inches.

Mauritius, *Philippines*, *Society Islands*, *Paumotus*.

Var. ERINACEA, Linn. Pl. 7, fig. 90.

Shell thicker, smaller, with a tuberculate shoulder and plications descending below them.

The synonyms include *Buc. nodulosum*, Gmel., and *B. biarmatum*, Dillw.

Var. KALOSMODIX, Melvill. Pl. 7, fig. 91.

Smooth as in typical *vibex*, but without the spines at the base of the outer lip. The shell is obscurely three-banded, with numerous longitudinal chestnut stripes, which become darker in crossing the bands, and arise from darker sutural flames; lip externally tessellated with brown. Length, 3·75 inches.

C. TORQUATA, Reeve. Pl. 7, figs. 92, 93.

Smaller and wider than *C. vibex*, the volutions less oblique, smooth, without varices; lip sparsely spinose throughout; flesh-color, with a row of square chestnut spots at the suture and another near the base, back of lip tessellated with chestnut. Length, 1·35–1·75 inches.

Port Jackson, Australia.

This is perhaps only an extreme variety of *C. vibex;* like that species, it has a spinose-shouldered variety.

C. ACHATINA, Lam. Pl. 8, figs. 94–98; Pl. 9, fig. 7.

Smooth, without varices; flesh-colored, longitudinally flamed with dark chestnut, often with narrow spiral bands of chestnut and white articulations; lip dentated throughout, or only below, externally banded with chocolate. Length, 2·5 inches.

Cape of Good Hope (Cuming); *Mauritius; Australia, N. Zealand, Philippines.*

C. turgida, Reeve (fig. 95), is a slight variety having a lighter shell, and which has not the articulations sometimes found on the type.

Var. PYRUM, Lam. Pl. 8, figs. 96–98; Pl. 9, fig. 7.

Smooth, often thick, with a superior line of more or less prominent nodules; these, when well developed, sometimes define a regular shoulder, and in such cases there are often inferior lines of less developed nodules; coloring much as in the type, the revolving bands of maculations usually more prominent, the longitudinal streaks less so.

Australia, Mauritius, Natal, Cape Verd Is. (Dunker).

This holds the same relationship to *C. achatina* that the var. *erinacea* does to the typical *vibex*.

The synonyms are *C. paucirugis*, Menke (fig. 7); *C. zelanica*, Lam.; *C. striata*, Hutton, and *C. nivea*, Brazier (fig. 98), a white variety.

C. Sophia, Brazier. Pl. 8, fig. 99.

Globosely inflated, rather solid, tabulately shouldered, spirally engraved, more distinctly so at the base; white, with several rows of distant, large chestnut blotches.

Length, 2·75 inches.

N. S. Wales, Australia.

C. glabrata, Dunker. Pl. 9, fig. 8.

Rather thin, without varices, smooth; white, with rare light chestnut flames at the suture. Length, 2·75 inches.

Zanzibar.

Appears to be sufficiently distinguished by its narrow form, elevated spire, coloring, and especially the absence of brown maculations on the lip varix.

Unfigured Species of Cassis.

C. doliata, Val. *W. Coast Central America.*
C. corrugata, Swainson. *Galapagos Is.*
C. nana, Tenison-Woods. *Australia.*
C. Thomsoni, Brazier. *N. S. Wales.*
C. umbilicata, Pease. *Sandwich Islands.*
C. vexillum, Kiener. = *Vexilla* (Purpuræ).
C. globulus, Menke. = *Desmoulea.*
C. scrobiculata, C. tenuilabris, C. muriçata, Menke. *Java.*

Genus CASSIDARIA, Lam., 1812.

C. echinophora, Linn. Pl. 9, figs. 9–11.

Globosely ovate, with five or six spiral tuberculated ribs on the body-whorl, and two or three smaller spiral ridges between each rib; light fulvous white, more or less stained with rusty brown; lip dentate within, and with the columellar callus white, interior of aperture rusty brown. Length, 2·5–4·25 inches.

Mediterranean Sea.

Varieties occur with two to four rows of tubercles, thus connecting it more closely with *C. Tyrrhena*, which has no tubercles—or, at most, a single superior row—and in which the revolving riblets are subequal, numerous and cord-like.

It is *Buccinum rugosum*, Linn, a variety with a single nodose band; *C. depressa*, Phil. (fig. 10), a variety with the prominent ribs not tuberculate; *C. tuberculosa*, Schum.; *C. Tyrrhena*, Sowb.

Genera; *B. nodosum*, Dillw.; *B. strigosum*, Gmelin; *Pyrula provincialis*, Martin (fig. 11), is an abnormal form. The operculum differs from that of Cassis in not having radiating ridges.

C. Coronadoi, Crosse. Pl. 9, figs. 12, 13.

Globose oval, rather thin, with rather close spiral riblets, two or three of which are a little more prominent than the others, and distantly tuberculate; yellowish brown, lip, columellar callus and interior whitish. Length, 4 inches.

Matanzas, Cuba.

A single specimen only is known. Mr. Crosse has described it as a Cassis, although recognizing its resemblance to *C. echinophora*.

C. Deshayesii, Duval. Pl. 9, fig. 6.

Ovate ventricose, strongly shouldered, longitudinally plicate, spirally sulcate, tuberculate on the shoulder; violaceous brown, with chestnut lines and spots; spire acute, mucronate; aperture white, lip dentate within, columella rugose above and below.

Length, 32 mill.

W. Coast of Africa.

The unfigured *C. acuta*, Gray, may be the same species.

C. Tyrrhena, Lam. Pl. 10, fig. 14.

Pear-shaped, thin, regularly corded with ridges with nearly equal interstices, sometimes an obscure shoulder is defined by a tuberculated ridge, yellowish brown; lip obsoletely plicate, and with the columellar callus, white. Length, 3–5·5 inches.

Mediterranean Sea, Atlantic Coast of France and Spain.

Is supposed by some conchologists to be a variety only of *C. echinophora*. It is *Buccinum ochroleucum*, Gmel.

Subgenus Sconsia, Gray, 1847.

C. striata, Lam. Pl. 10, figs. 15, 16.

Closely spirally thread-striate, decussated into nodules above and on the spire by rugose growth-lines, lip and columella both strongly plicate throughout; whitish or brownish, showing a few light chestnut quadrangular spots on the upper part of the columellar callus. Length, 2–2·5 inches. *West Indies.*

C. lævigata, Sowb., and *C. sublævigata*, Guppy, are fossil representatives of this shell.

C. Grayi, A. Ad. (fig. 16), is said to be thinner and more ventricose, more finely grooved, the spire less acute, outer lip not so much thickened and inflexed, and plicate, not crenate internally. I suspect that it is a synonym; and probably the next species is at most only a variety.

C. Barbudensis, Higgins and Marrat. Pl. 10, fig. 17.

Ovate, light yellowish brown, with longitudinal light chestnut flames; indistinctly spirally striate, decussated towards the lip and varix. Differs from *C. striata* in the plications of the inner lip being confined to the anterior portion, in the striations, which are not crenulated above, and in its flamed color pattern.

Length, 2·75 inches.

Isl. of Barbuda, W. I.

A single empty shell dredged in fifteen fathoms. Possibly only a variety of *C. striata.*

Genus ONISCIA, Sowb., 1824.

Section 1. Oniscia, *sensu stricto.*

O. oniscus, Linn. Pl. 10, figs. 18, 19.

With three spiral, tuberculated ribs, and a number of spiral raised lines between them, the ribs cut by revolving impressed lines; columellar callus minutely tuberculate, outer lip denticulated within; whitish, dotted and spotted with chestnut or chocolate, the dots sometimes approaching blue-black, lip white.

Length, 1–1·25 inches.

West Indies.

O. triseriata, and perhaps *O. quadriseriata*, Menke, are synonyms.

Var. Lamarcki, Desh. Pl. 10, fig. 19.

Columellar callus rose-pink, the granules upon it white, outer lip often peppered with chestnut spots.

It is *Cypræa conoidea* of Scopoli.

O. tuberculosa, Sowb. Pl. 4, figs. 68, 69.

Whorls encircled by five rows of large blunt tubercles and numerous intermediate ridges; columellar lip finely granulated, outer lip somewhat contracted in the middle, dentate within;

marbled and reticulated with chestnut or chocolate and white, interior white or sometimes bright saffron-colored.

Length, 1·25–1·5 inches.

Galapagos Is., *Mazatlan*, *La Paz*, *L. C.*

O. xanthostoma, A. Ad., is a synonym, being the variety with yellow aperture.

O. Strombiformis, Reeve. Pl. 4, fig. 70.

Spire elevated, pointed, whorls angulated above, encircled by numerous narrow nodulous ridges; columellar lip minutely granulated, outer lip ridged within, with a short interrupted rib in the interstices; white, dotted and spotted with chestnut, lips white. Length, 22 mill.

West Indies.

I have not seen this species.

Section II. Oniscidia, Swainson, 1840.

O. Dennisoni, Reeve. Pl. 10, fig. 20.

Whorls angulated above, longitudinally compressly plicated, crossed and cut into short spines by numerous revolving riblets; columellar lip minutely granulated, outer lip irregularly denticulately ridged; whitish, obscurely three- or four-banded with chestnut, lips orange-red, with the granules and plications whitish. Length, 2 inches.

Guadeloupe, *W. I.* (Beau).

I find no other authority for the habitat of this very beautiful species.

O. cancellata, Sowb. Pl. 10, fig. 21.

Whorls rounded above, longitudinally narrowly plicated, decussated by regular equidistant revolving riblets, the interstices spinose; whitish or brownish white, three-banded with light chestnut, aperture white. Length, 1·5–2·5 inches.

China.

O. exquisita, Ad. and Reeve. Pl. 8, fig. 100.

Whorls shouldered, encircled by rows of papillary tubercles, with intervening ridges; whitish, sparingly dotted, and behind the lip three-spotted with orange-brown, lips pink, the granules and plications white. Length, 1·5 inches.

Sooloo Sea; Australia.

O. ponderosa, Hanley (Pl. 10, fig. 22), is a synonym.

Unfigured Species of Oniscia.

O. GRANDIS, A. Ad. (perhaps = *exquisita*). *China Sea.*
O. CITHARA, Watson. *Ké Islands, W. of Papua.*
O. LAMARCKII, Lesson. *Australia.*

Genus PACHYBATHRON, Gaskoin, 1853.

P. CASSIDIFORME, Gaskoin. Pl. 8, figs. 1–3.

White, with three ash-colored bands, longitudinally plicately striate, whorls ridged around the suture. Length, 6 mill.

Is. of St. Vincent, Bonaire, Curaçoa, West Indies.

P. MARGINELLOIDEUM, Gaskoin. Pl. 8, figs. 4, 5.

Yellowish white, with three or four spiral rows of chestnut-colored sagittate markings; whorls smooth at the suture, chestnut margined. Length, 5 mill.

West Indies.

In Chenu's "Manuel" the names of the species illustrated have been transposed.

INDEX AND SYNONYMY.

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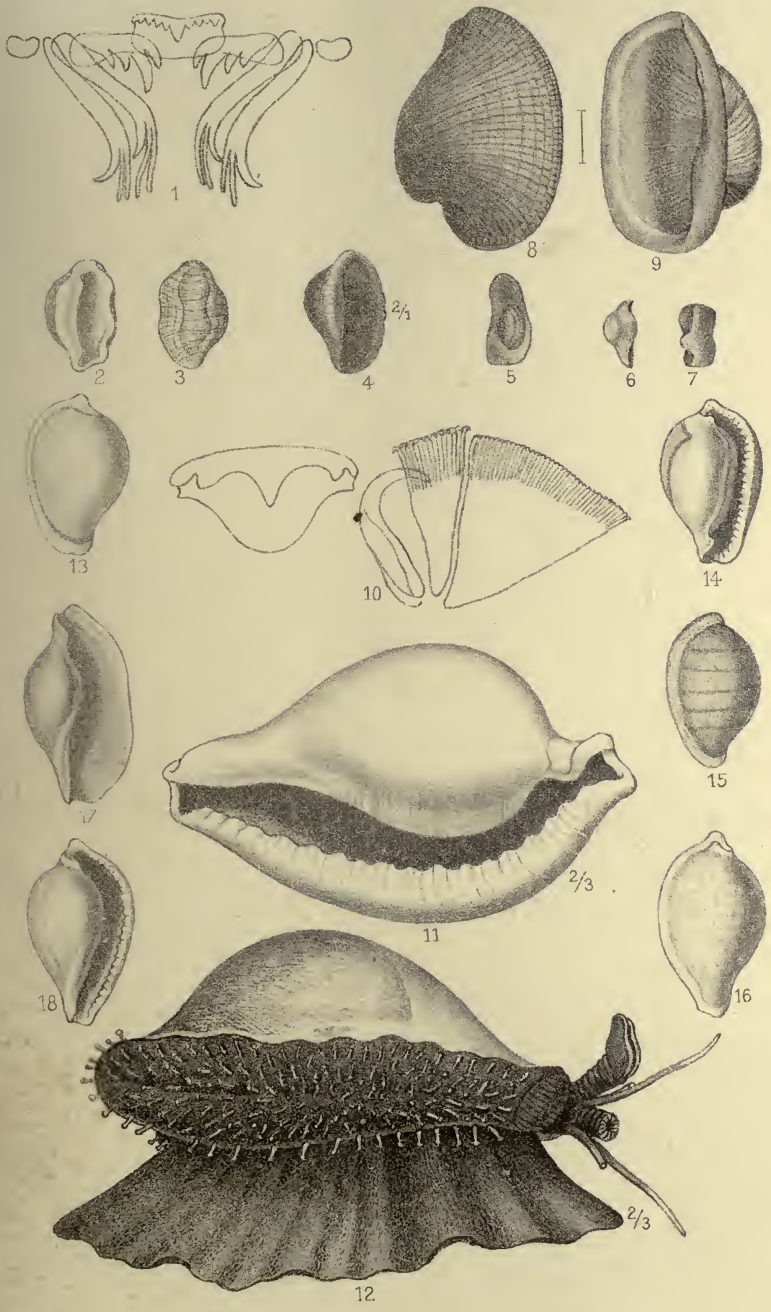
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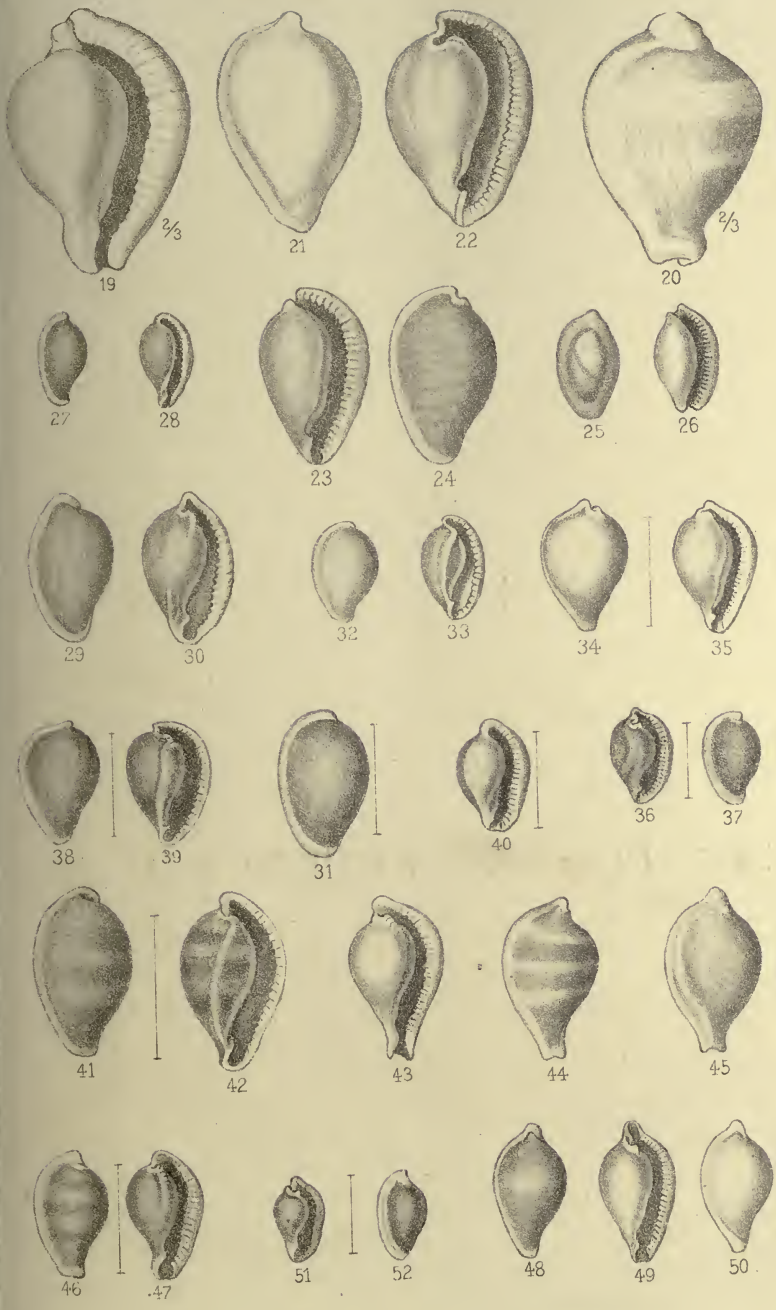
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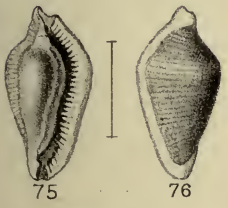
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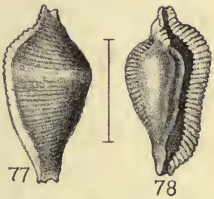
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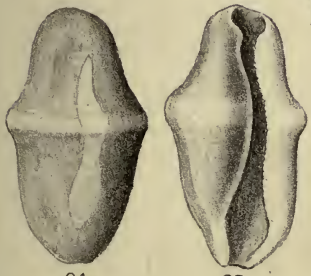
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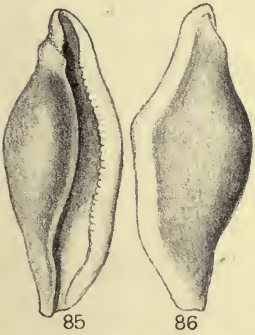
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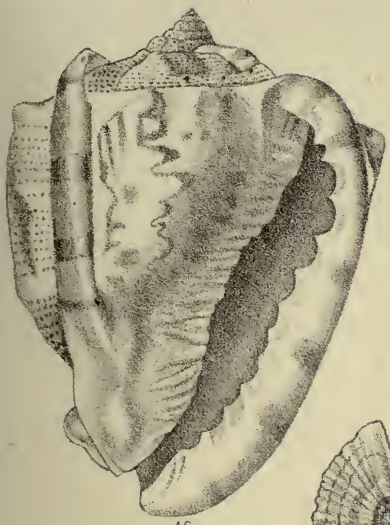

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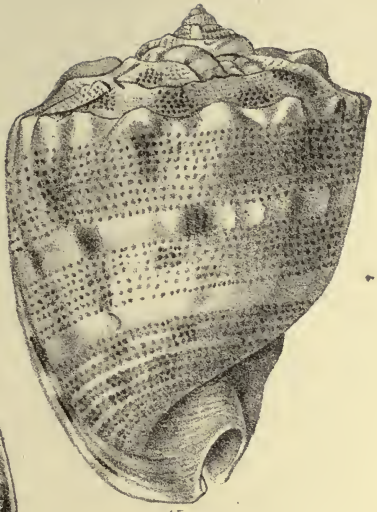

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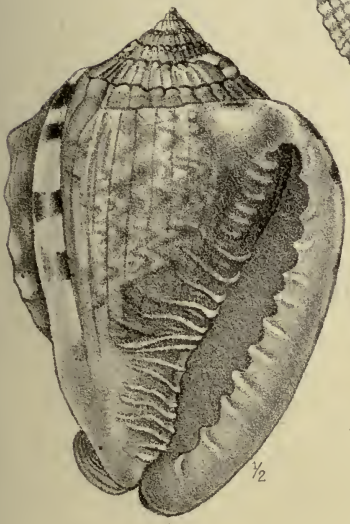

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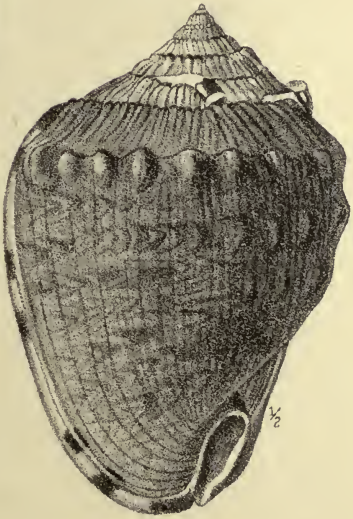

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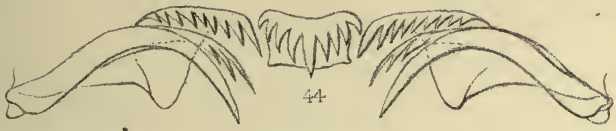

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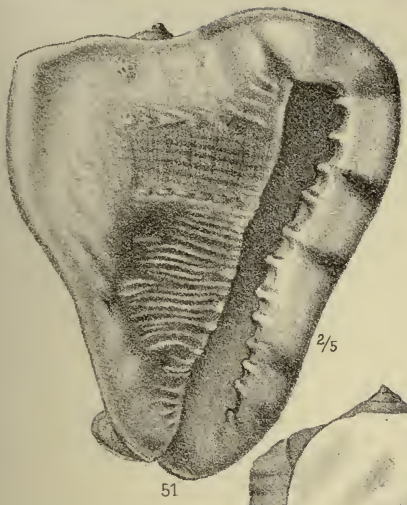

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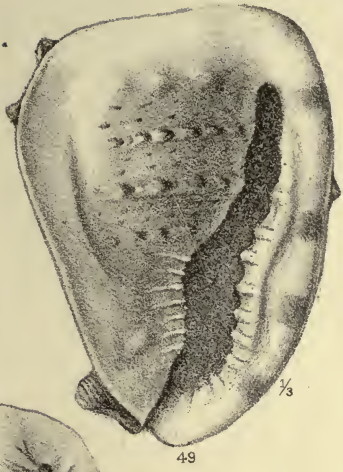

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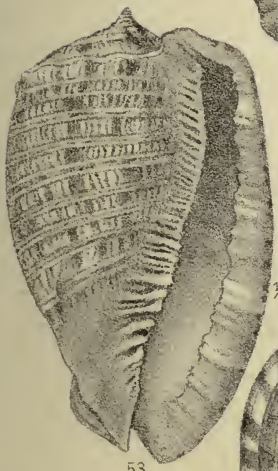

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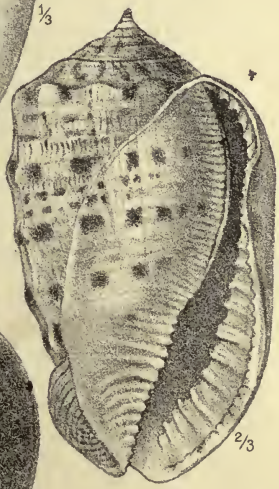

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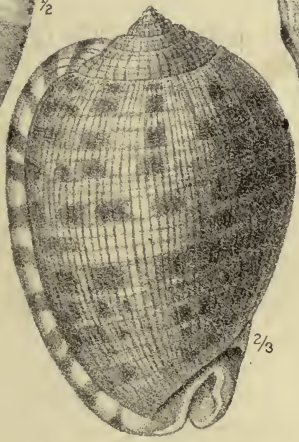

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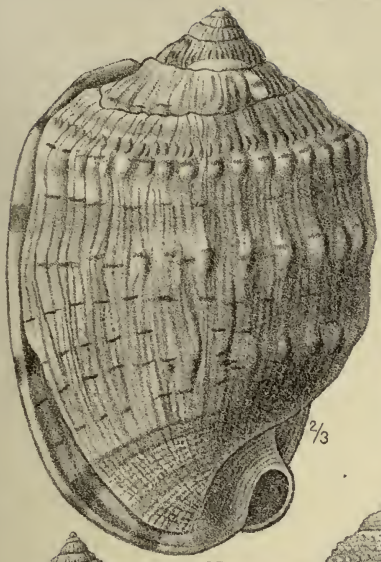

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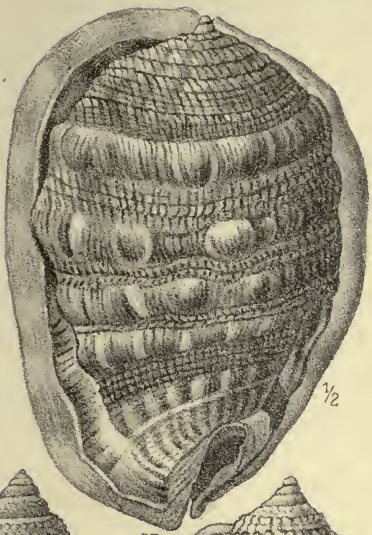

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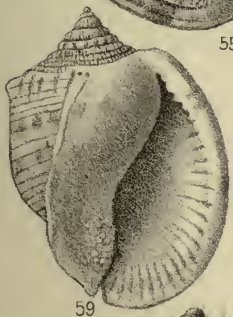

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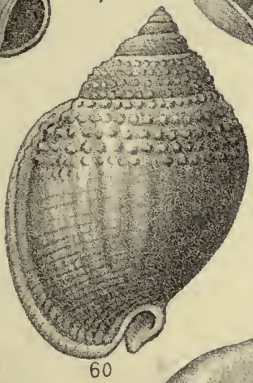

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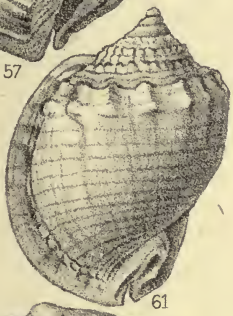

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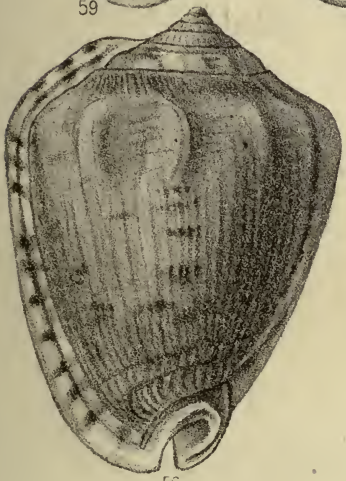

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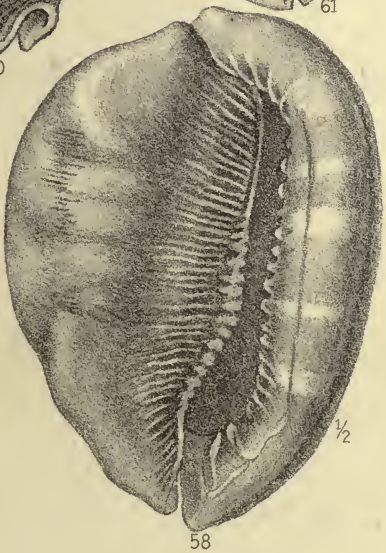

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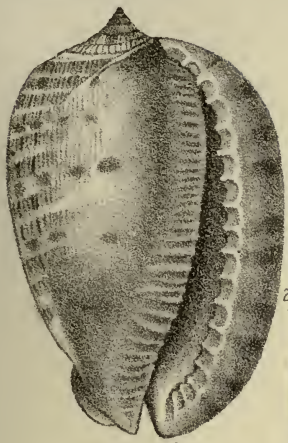

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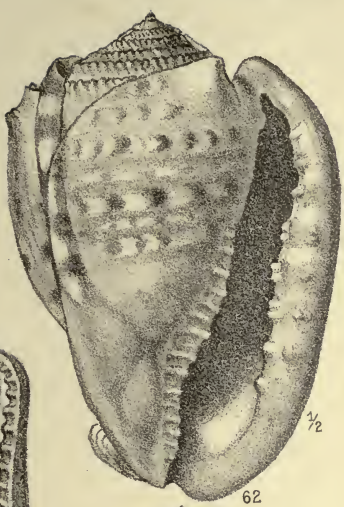

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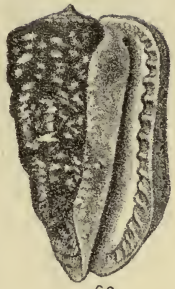

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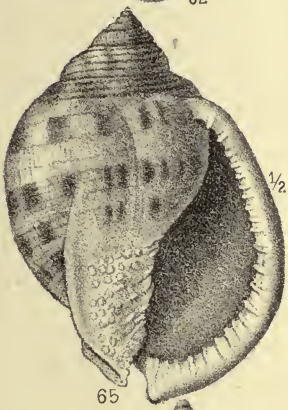

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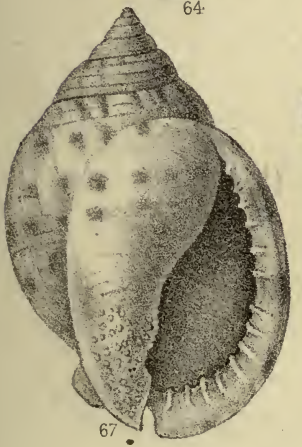

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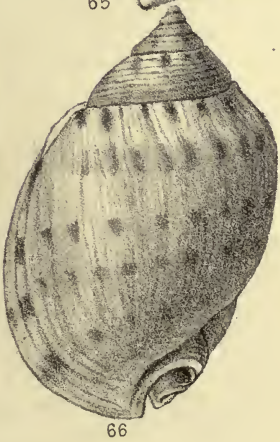

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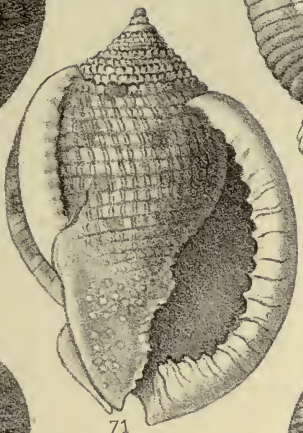
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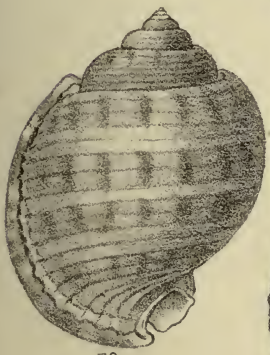
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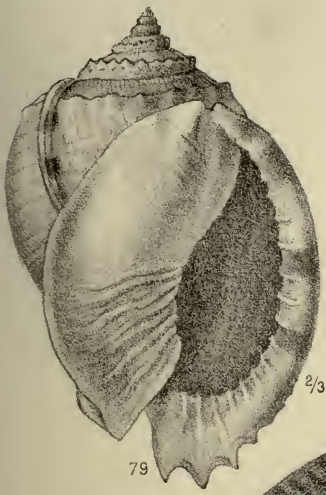

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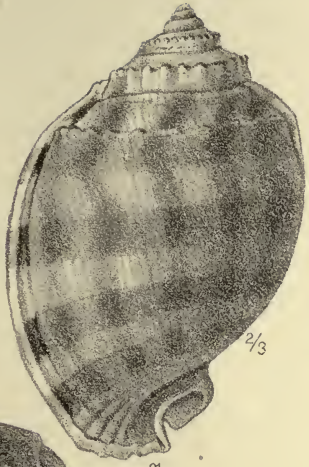

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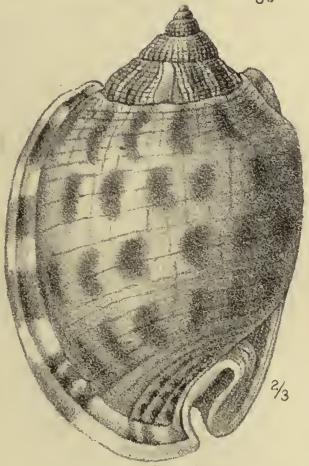

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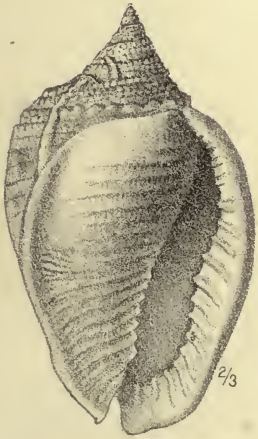

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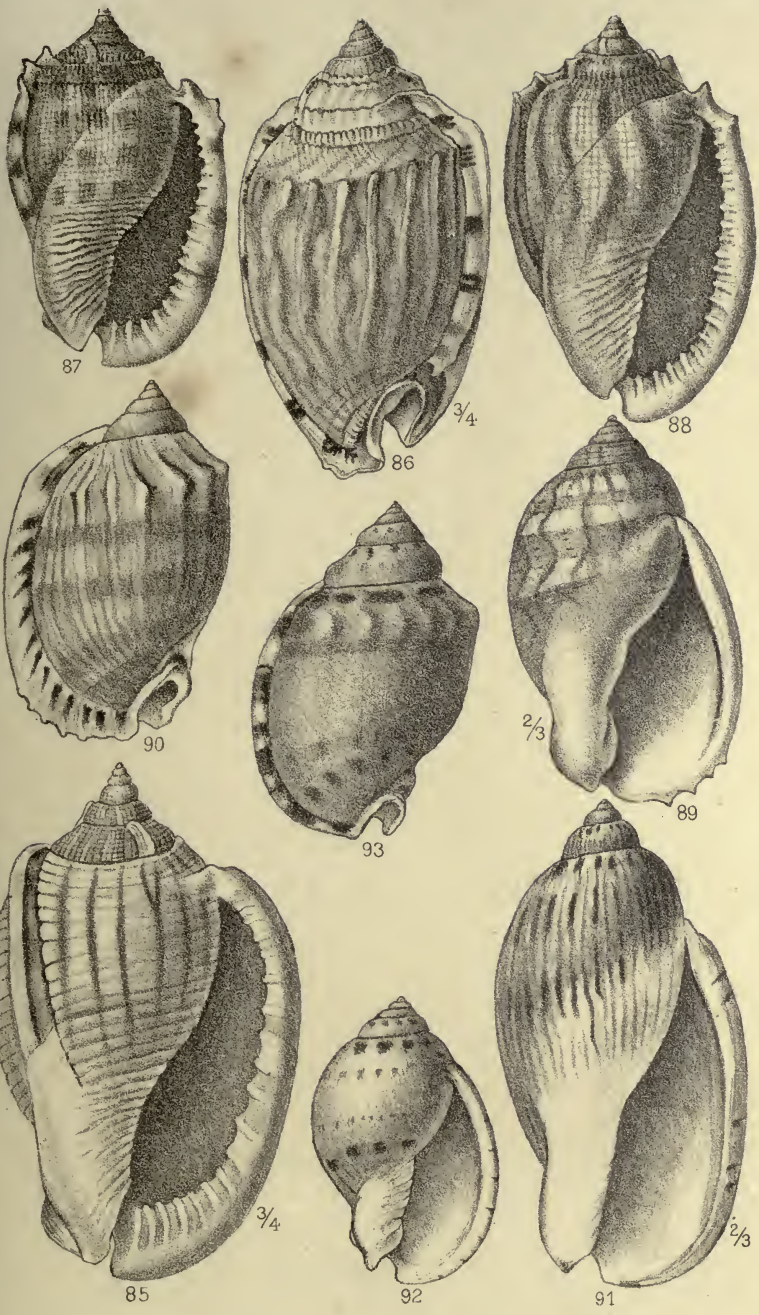
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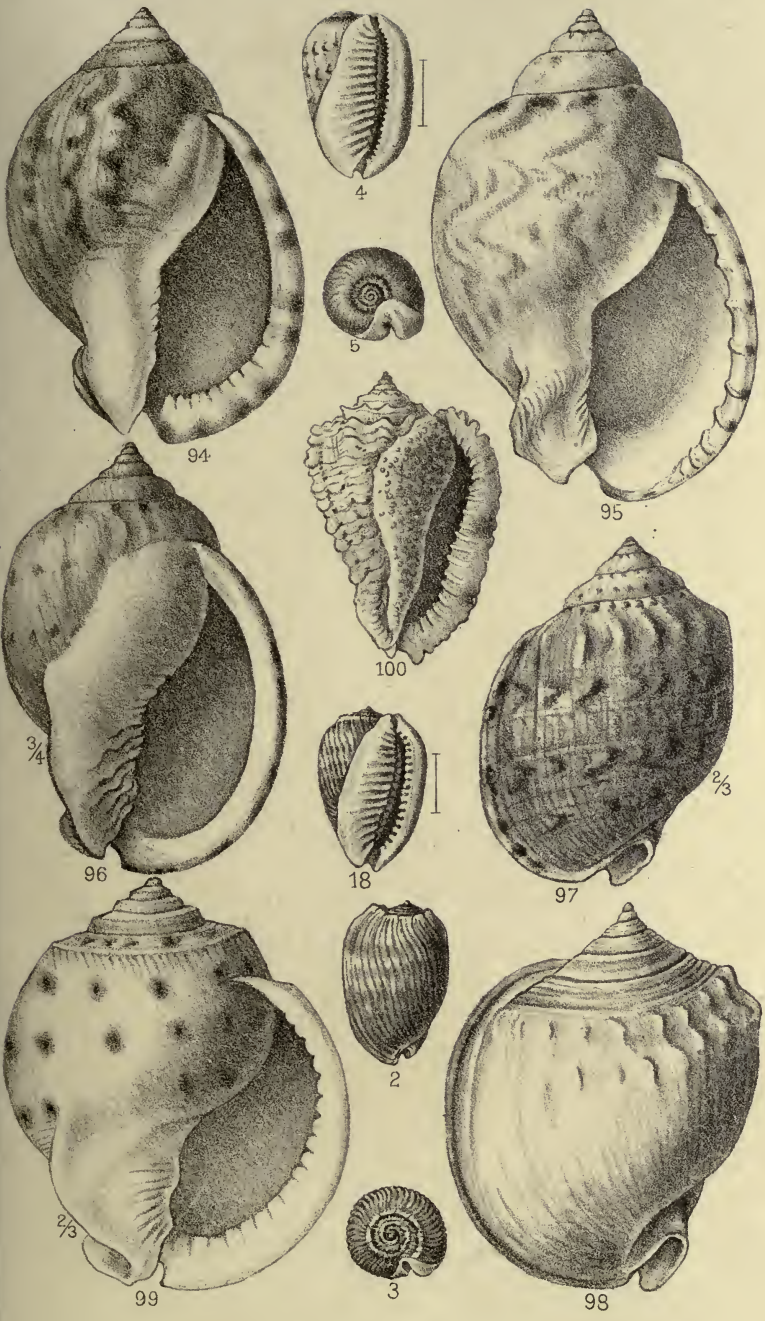
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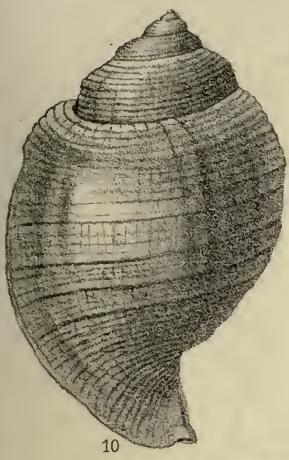
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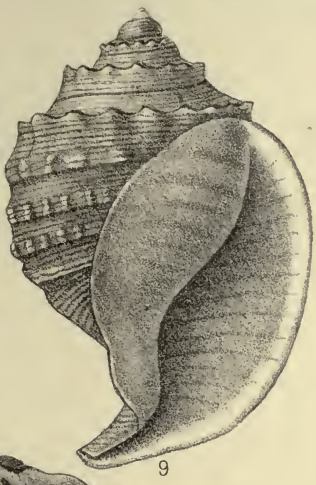
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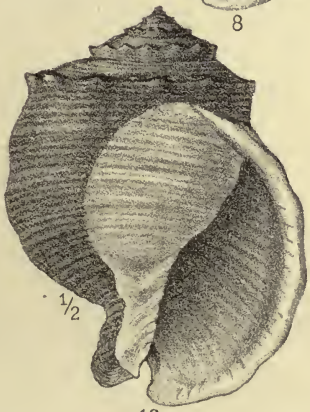
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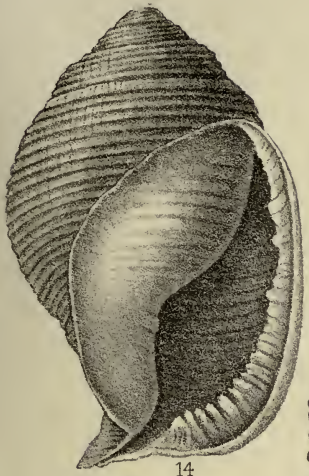
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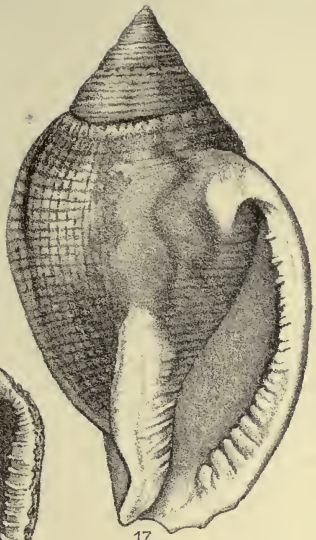
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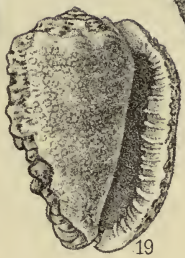
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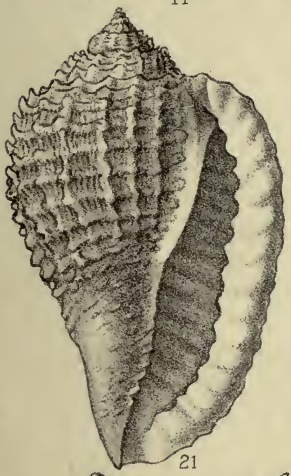
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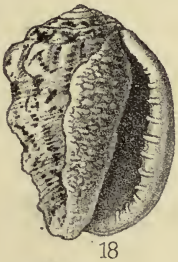
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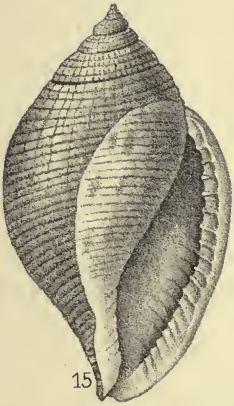
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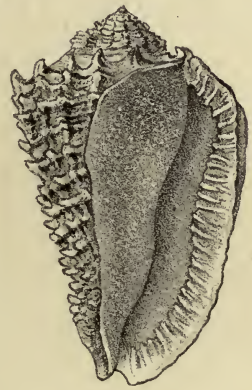
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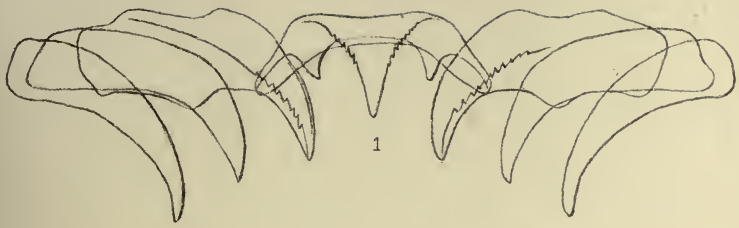
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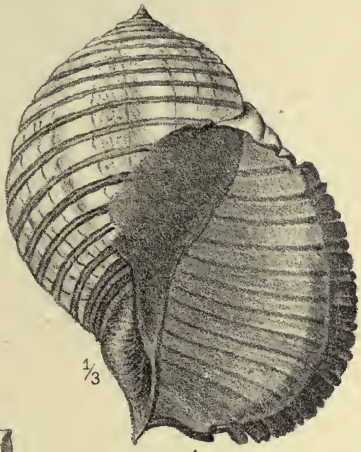
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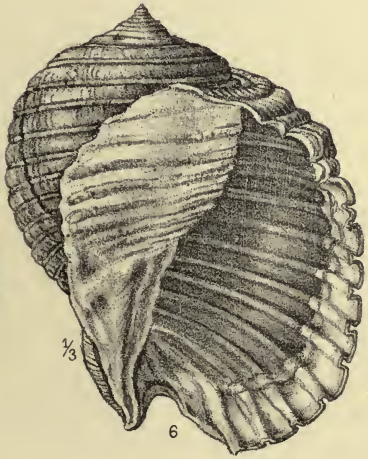
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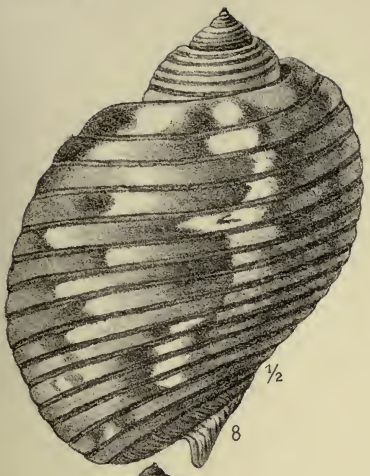

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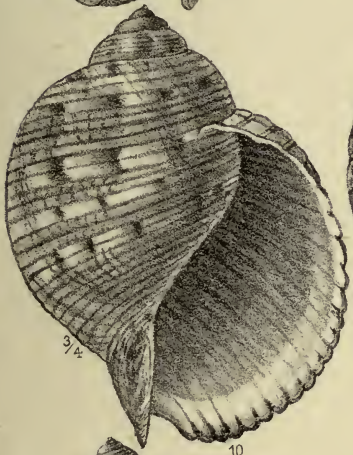

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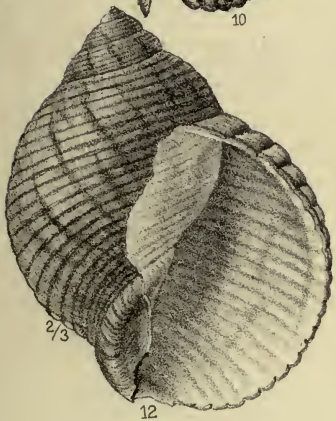

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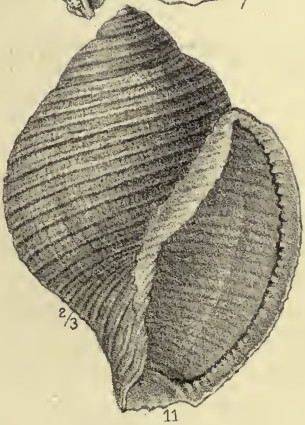

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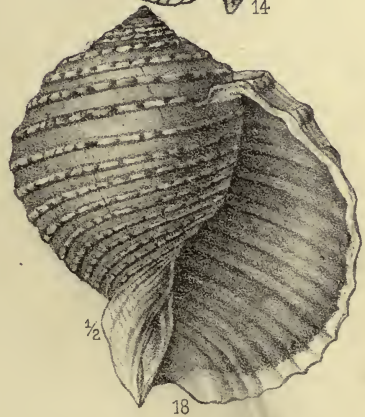

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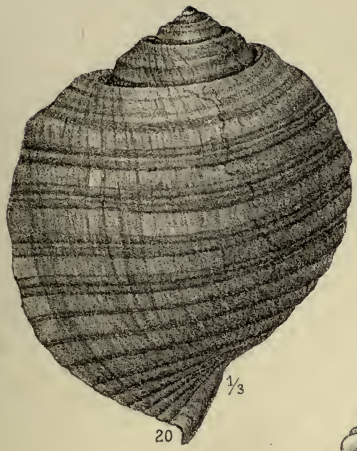
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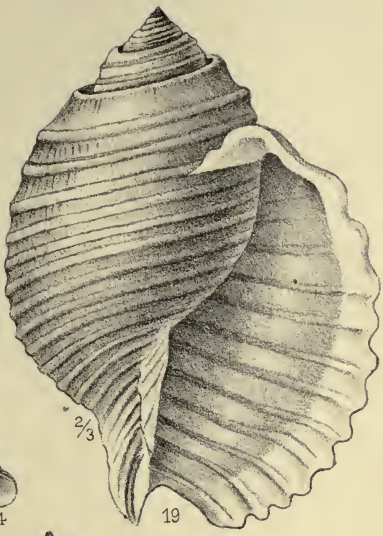
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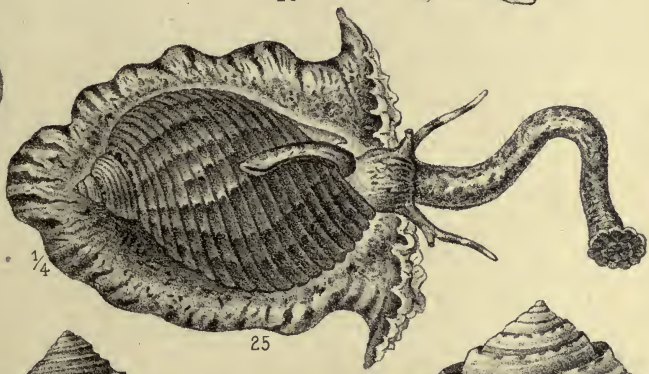
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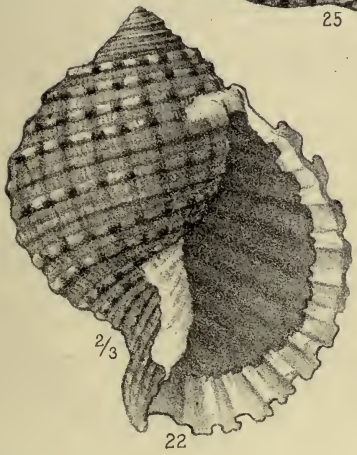
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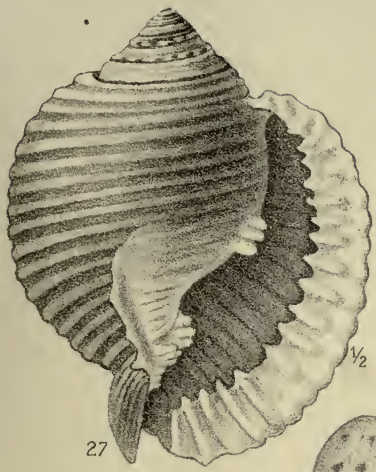

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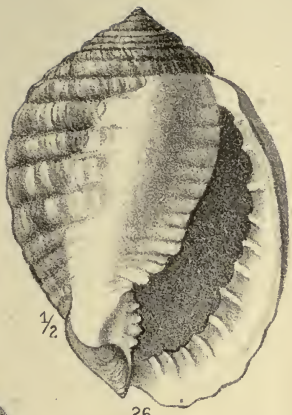

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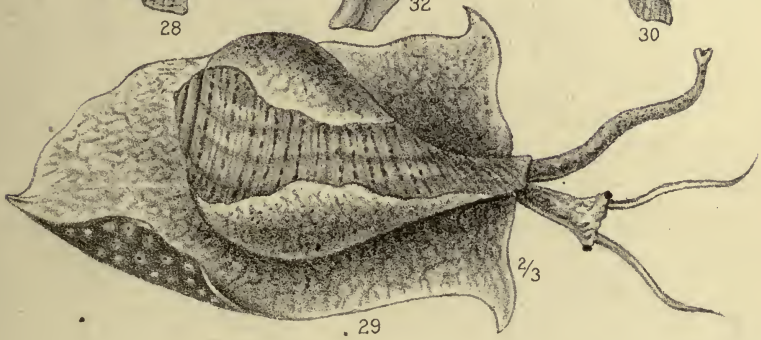

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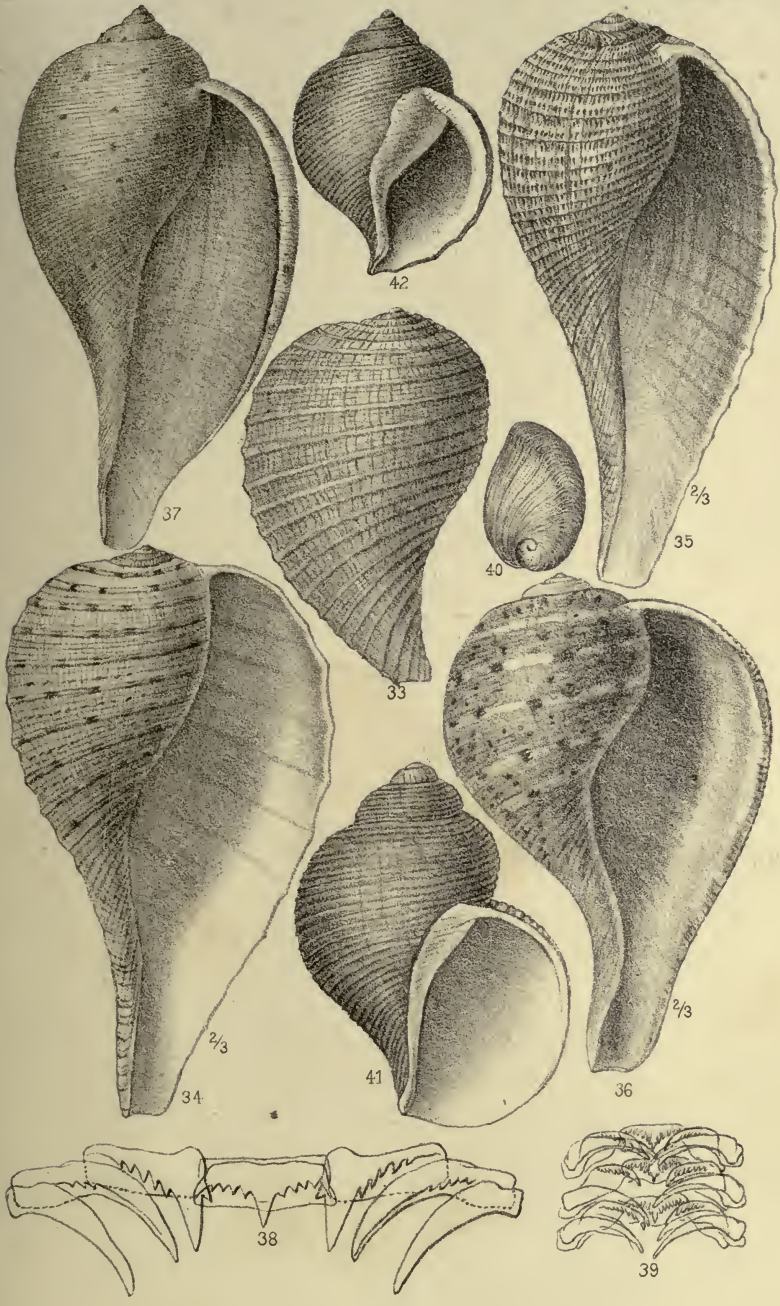
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